

NIGERIA.

ANNUAL



MEDICAL AND SANITARY
REPORT

FOR THE YEAR

1924.

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Annual Medical and Sanitary Report on Nigeria for the year 1924.

I. ADMINISTRATIVE.

ESTABLISHMENT (including vacancies).

MEDICAL AND SANITARY.

- Director of the Medical and Sanitary Service.
- Deputy Director of Medical and Sanitary Service.
- Deputy Director of Sanitary Service.
- 6 Assistant Directors of Medical Service.
- 1 Assistant Director of Sanitary Service.
- 4 Specialist Medical Officers.
- 3 Senior Sanitary Officers—(1 vacancy).
- 11 Senior Medical Officers.
- 92 Medical Officers—(34 vacancies).
- 5 Medical Officers of Health.
- 5 Medical Officers (African).
- 1 Assistant Medical Officer of Health, African (paid by Town Council).

RESEARCH.

- 1 Director of Medical Research Institute.
- 1 Assistant Bacteriologist—(vacant).
- 1 Government Analyst.

DENTAL.

- 2 Government Dental Surgeons—(1 vacancy).

TSETSE-FLY INVESTIGATION. (TEMPORARY).

- 1 Investigator (Seconded from Medical Staff).
- 1 Entomologist (Special Service Officer).

NURSING STAFF.

- 7 Senior Nursing Sisters.
- 20 Nursing Sisters—(4 vacancies).

SUBORDINATE MEDICAL AND SANITARY STAFF (EUROPEAN).

- 1 Confidential Clerk.
- 9 Sanitary Inspectors—(1 vacancy).
- 2 Staff Sergeants—(Appointment abolished).
- 4 Sergeants—(1 dismissed).
- 1 Male Nurse—(Invalided—Appointment abolished).
- 1 Hospital Dispenser and Storekeeper.
- 1 Laboratory Attendant.

SUBORDINATE MEDICAL AND SANITARY STAFF (AFRICAN).

- 1 Clerk, Higher Division, Grade I.
- 2 Clerks, Higher Division, Grade II.
- 12 Clerks, Higher Division, Grade III.
- 38 Clerks, Lower Division and Probationers.
- 1 Medical Storekeeper and Warden.
- 2 Chief Dispensers.
- 1 Assistant Chief Dispenser.
- 1 Registrar of Vital Statistics.
- 1 Deputy Registrar of Vital Statistics.
- 13 First Class Dispensers.
- 54 Second Class Dispensers.
- 19 Dispensers-in-Training.
- 38 First Class Nurses.
- 87 Second Class Nurses.
- 73 Nurses-in-Training.
- 1 Theatre Assistant.
- 3 First Class Sanitary Inspectors.
- 10 Second Class Sanitary Inspectors.
- 36 Third Class Sanitary Officers.
- 26 Sanitary Inspectors-in-Training.
- 62 Vaccinators.
- 5 Laboratory Assistants.
- 1 Senior Attendant.
- 10 Storekeepers.
- 16 Messengers.
- 1 Chief Cook.
- 16 Cooks and Assistant Cooks.
- 5 Carpenters.
- 18 Lunatic Asylum Attendants.

FINANCIAL.

(a) Statement of Revenue for the year 1924.	£	s.	d.
Hospital and Medical Receipts	6,657	5	2
(b) Statement of Expenditure for the year 1924.			
Medical Department (including Sanitary).			
HEADS 16 AND 17.	£	s.	d.
Personal Emoluments	154,557	3	7
Other Charges	66,078	0	4
	<u>£220,635</u>	<u>3</u>	<u>11</u>

II. PUBLIC HEALTH.

GENERAL REMARKS.

The Returns for the year are for the combined Colony and Protectorate of Nigeria including the British Mandated territory of the Cameroons.

Total cases treated in Government hospitals and dispensaries.

			1922.	1923.	1924.
Europeans	...	...	5,930	5,993	5,741
Natives	...	...	161,874	213,326	205,870
Total	...	...	<u>167,804</u>	<u>221,242</u>	<u>211,611</u>

Total deaths in Government Hospitals and Dispensaries.

			1922.	1923.	1924.
Europeans	...	...	38	21	33
Natives	...	...	953	1,281	1,649
Total	...	...	<u>991</u>	<u>1,302</u>	<u>1,682</u>

The general health of the European community was fairly good. There has been no striking increase or decrease of sickness. Among the Africans the return is no index of general health. Very severe epidemics of cerebrospinal meningitis and relapsing fever were reported from the Northern Provinces. In the Southern Provinces the incidence of plague in the latter half of the year considerably increased the death rate in the area affected. Apart from the epidemics the health of the country appears to have undergone no change. There has been a decrease in the total Africans treated of approximately 7,500. No explanation of this can be offered. Malaria is the commonest disease. Rheumatic Fever shows a notable decrease in cases treated, 109 as compared with the high figure of 1,104 for the previous year. Tuberculosis and syphilis appear to be on the increase. The increase in the number of cases of yaws treated is gratifying as an indication that these patients are coming in more freely for treatment. Influenza shows a much higher figure than formerly but did not appear in epidemic form.

COMMUNICABLE DISEASES.

The number of patients attending for malaria increased by almost 2,000 among Africans but this cannot be attributed to increased incidence. Among Europeans there was slightly less malaria. The Aestivo-autumnal type of malaria predominates.

Blackwater Fever.—Twenty-four cases in Europeans occurred with twelve deaths—the case mortality being about double that in 1923.

Seven cases with no deaths also occurred in Africans.

Yellow Fever.—Two cases occurred with two deaths.

Trypanosomiasis.—No case was reported in Europeans. Thirty-nine cases in Africans were reported with eight deaths.

Taenia Saginata is almost confined to the Northern Provinces where there is a preponderance of meat eaters.

Cerebrospinal Meningitis, Relapsing Fever.—The returns show 390 cases of the former with 244 deaths and 733 cases with eighty-nine deaths of the latter. Both diseases were epidemic during the year under survey. It is difficult to give any idea of the true extent of these diseases as the reports are largely from the Political Department and there is great difficulty in getting cases seen by the Medical Officers.

Relapsing Fever was definitely diagnosed in Sokoto, Kano and Bornu Provinces and cerebrospinal in Kano, Nassarawa, Niger and Muri Provinces.

Trypanosomiasis.—See appendix for report of Tsetse Investigator.

Small pox.—The year under survey did not show any severe outbreaks of this disease.

Venereal Diseases.—The actual number of cases coming under treatment represents but a small fraction of the actual prevalence. One can only guess at the latter but it is a fairly reliable guess to say that both Syphilis and Gonorrhœa are widespread throughout the country. A campaign has been started among the troops, mainly in the direction of early treatment. Actual preventive methods do not hold out any prospect of success but the introduction of Irrigation treatment for Gonorrhœa has had an immediate success in attracting the soldiers to come under treatment immediately they are aware of the infection. The facility for irrigation immediately on return to camp has been provided but there is as yet no evidence of its being largely taken advantage of. In another year it should be possible to show whether any definite improvement can be demonstrated statistically. Yaws is not found in any numbers except in the Delta of the Niger and in the Cross River Region.

Leprosy.—No advance has been made in the treatment of this disease. The reports all indicate great reluctance on the part of patients to submit to treatment and those who do submit rarely continue for a sufficient period. Special reports are called for in 1925.

Ankylostomiasis.—No cases were reported among Europeans. There were 998 cases treated among Africans as compared with 605 in the previous year. This is, however, not an indication of increased incidence. The infection rate is high in the Delta of the Niger and in the Cross River region, Enugu, in the vicinity of Coal mines, has possibly the highest rate of infection of any place in Nigeria. It is notable, however, that the disability resulting from the infection is extremely low taken as a whole. About half the cases are reported from Port Harcourt where the population is very mixed but has a large importation from Enugu and Ikot-Ekpene. Buea and Enugu have also high figures.

Guinea-Worm was more or less equally prevalent throughout Nigeria but the incidence appears to be somewhat less than in the previous year. Only fourteen cases were reported in Lagos and these were probably all imported. This may fairly be regarded as one of the benefits of a good water supply.

EUROPEAN OFFICIALS.

The invalidings for 1924 are fewer than in the two previous years. There were 119 invalidings, thirty under the old conditions and eighty-nine under the new conditions.

The Invalidings and Death Rates of European Officials per thousand of average number resident were as follows:—

Invaliding Rate per 1,000	..	75·94
Death Rate per 1,000	... ..	10·21

TABLE SHOWING CLASSIFICATION OF INVALIDINGS.

Serving under	Under 6 months.	6 but under 9 months.	9 but under 12 months.	12 but under 15 months.	15 but under 18 months.	Over 18 months.
Old leave condition ...	3	8	15	3	1	Nil.
New leave condition ...	7	12	16	20	33	1

Those invalided permanently by the Medical Adviser to the Colonial Office, are not shown in above table.

Strength of Government Officials under Old Leave Regulations	663
“ “ “ “ New Leave Regulations	1,258
The invaliding rate per thousand under Old Regulations is	... 45·24
“ “ “ “ New Regulations is	... 70·74

TABLE SHOWING SICK, INVALIDING AND DEATH RATES,
EUROPEAN OFFICIALS.

	1922.	1923.	1924.
Total number resident	2,110	2,092	1,921
Average number resident	1,406	1,396	1,567
Total number on sick list	1,521	1,252	1,518
Total number of days on sick list	11,204	14,542	15,428
Average daily sick	30·69	39·84	42·2
Percentage of daily sick to average number resident ...	2·18	2·85	2·55
Average number of days to each patient	7·37	11·615	10·16
Average sick time to each resident	9·83	10·42	8·03
Total number invalided	137	146	119
Percentage of invalided to number resident	6·49	6·98	6·19
Percentage of invalided to average number resident ...	9·74	10·46	7·59
Total number of deaths	7	16	16
Percentage of deaths to number resident	0·33	0·76	·83
Percentage of deaths to average number resident ...	0·50	1·15	1·02

TABLE SHOWING SICK, INVALIDING AND DEATH RATES,
AFRICAN OFFICIALS.

	1922.	1923.	1924.
Total number resident	2,928	3,050	3,195
Average number resident	2,706	2,936	3,104
Total number on sick list	3,661	2,525	3,536
Total number of days on sick list	26,153	19,454	25,680
Average daily sick	71·65	53·3	70·36
Percentage of daily sick to average number resident ...	2·64	1·8	2·2
Average number of days to each patient	7·14	7·7	7·3
Average sick time to each resident	9·16	6·6	8·03
Total number invalided	24	36	13
Percentage of invalided to number resident	·82	1·18	·40
Percentage of invalided to average number resident	·88	1·23	·419
Total deaths	26	13	11
Percentage of deaths to number resident... ..	·88	·426	·344
Percentage of deaths to average number resident ...	·96	·44	·354

SOLDIERS—NIGERIA REGIMENT--W.A.F.F.

	1922.	1923.	1924.
Average Strength	3,461	3,355·68	3,398
Sick Rate per 1,000	51·5	134·9	1,055·61
Death Rate per 1,000	4·91	6·56	6·54

POLICE FORCE.

	1922.	1923.	1924.
NORTHERN PROVINCES.			
Average Strength	1,182	1,232	1,235
Sick Rate per 1,000	43·5	415	477·
Death Rate per 1,000	5·92	12·17	18·62
SOUTHERN PROVINCES AND COLONY.			
Average Strength	1,646	1,641	1,828
Sick Rate per 1,000	58·76	75·55	72·28
Death Rate per 1,000	8·31	7·79	10·6

PRISONERS—GOVERNMENT PRISONS.

	1922.	1923.	1924.
NORTHERN PROVINCES.			
Total Number of Prisoners	2,778	2,579	...
Average Strength	782	666	2,507
Sick Rate per 1,000	44·2	540·54	143·59
Death Rate per 1,000	24·3	25·52	5·58
SOUTHERN PROVINCES.			
Total Number of Prisoners	31,360	35,301	31,703
Daily Average number of Prisoners	6,242	7,316·41	6,658·31
Sick Rate per 1,000 (of daily average)	83·3	132·63	538·45
Death Rate per 1,000 (of daily average)	23·06	30·34	34·39

NATIVE ADMINISTRATION PRISONS.

	1922.	1923.	1924.
Total Number of Prisoners	10,003	9,300	13,301
Daily Average	3,310·95	3,369·98	3,168·35
Total Deaths	203	129	345
Death Rate per 1,000 (of average number)	60·10	38·27	108·9

I regret to say that I do not consider the sick rate figures as by any means accurate. The high death rate in the Native Administration Prisons should be attributed to epidemics occurring mainly in two Prisons Kano and Bornu, in common with the surrounding country.

NON-OFFICIAL EUROPEAN POPULATION.

All the data for the table of sick Invalidings and Deaths are not available. The total number invalided during the year was 60 and the total deaths 23. The population at the end of the year was 2,347 but there is considerable fluctuation throughout the year. The invalidings and deaths are both up but I do not regard the year as by any means a bad one.

SUMMARY OF VITAL STATISTICS.

LAGOS AND EBUTE METTA.

	1922.	1923.	1924.
Total population	102,260	104,530	105,763
Total Births	3,263	3,420	3,415
Birth Rate per 1,000	36·41	32·7	32·2
Total Deaths	2,628	2,492	3,251
Death Rate per 1,000	24·73	23·8	26·9
Infant Deaths under 1 year ...	948	904	806
Infantile Mortality per 1,000 ...	290·5	264·09	236·01
Total Stillbirths	163	172	158

THOS. B. ADAM,

Acting Director of Medical and Sanitary Service.

TABLE IV.

RETURN OF DISEASES AND DEATHS (EUROPEAN)
FOR YEAR, 1924.

Diseases.	* IN-PATIENTS.					OUT-PATIENTS.	
	‡ Remaining in Hospital at the end of 1923.	TOTAL.		† Total cases treated.	§ Remaining in Hospital at the end of 1924.	TOTAL.	
		Admis- sions.	Deaths.			Cases treated.	Deaths.
Infective Diseases.							
Beri-Beri
Cerebro-Spinal Fever
Chicken Pox	2	...
Cholera
Dengue	10	...	10	...	11	..
Diphtheria
Dysentery :—							
(a) Amœbic	1	50	1	51	1	38	...
(b) Bacillary
(c) Type not determined	4	...
Endocarditis-infective
Enteric	6	...	6	...	3	...
Erysipelas	2	...
Gonorrhœa	9	...	9	...	107	...
Influenza	1	30	...	31	...	153	...
Kala-Azar
Leprosy :—							
(a) Nodular
(b) Anaesthetic
Malaria :—							
(a) Tertian	18	...	18	1	3	...
(b) Quartan
(c) Aestivo-autumnal	5	240	1	245	3	807	...
(d) Chronic	8	1	8	1	15	...
(e) Type not determined	19	...
Blackwater Fever	1	15	9	16	1	8	3
Measles	1	...	1	...	2	...
Papataci Fever	1	...	1	...	1	...
Plague
Pneumonia	6	1	6	1	12	1
Pyrexia of uncertain origin	1	...	...	1	...	20	...
Rabies
Relapsing Fever	1	...
Rheumatic Fever	2	...
Septicaemia	1	1
Small-Pox	2	1
Syphilis (a) Primary	2	...	2	...	13	...
(b) Secondary	2	...	2	...	13	...
(c) Inherited
Tetanus
Trypanosomiasis (Sleeping Sickness)
Tuberculosis	12	1	12	...	5	...
Undulant Fever
Whooping Cough
Yaws
Yellow Fever	1	1	1	...	1	1
Other Diseases	2	...	2	...	1	...
Intoxications.							
Alcoholism	1	5	...	6	...	8	...
Morphinism
Other Intoxications
Carried forward

The form shows in the main the arrangement of diseases in the Nomenclature of the Royal College of Physicians, 1906 Edition.

* In-patients are those treated in Hospitals and Institutions, and the term does not apply to those treated in their own quarters, even though they would ordinarily be in-patients if there were suitable accommodation.

† "Total cases treated" will, of course, include those remaining in Hospital at the end of the previous year.

‡ i.e., the year previous to that for which the return is made.

§ The figures in this column to be carried on to the next year's return.

Note:—Diseases not enumerated in this table should be entered as "Other Diseases" under their appropriate headings, and should not be specified.

TABLE IV.—RETURN OF DISEASES AND DEATHS (EUROPEAN)

FOR THE YEAR, 1924—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at the end of 1923.	TOTAL.		Total cases treated.	Remaining in Hospital at the end of 1924.	TOTAL.	
		Admis- sions.	Deaths.			Cases treated.	Deaths.
General Diseases.							
Brought forward
Anæmia	29	...	29	...	185	...
Anæmia-Pernicious
Diabetes	1	...
Exophthalmic goitre...
Gout	1	2	...	3	..	8	...
Leucocythæmia
Lymphadenoma
Myxœdema
Purpura
Rickets...
Scurvy
Other Diseases	9	...	9	...	48	...
Local Diseases.							
DISEASES OF THE NERVOUS SYSTEM.							
Sub-section 1.—Diseases of the Nerves:—							
Neuritis	6	...	6	...	27	...
Meningitis
Myelitis
Hydrocephalus
Encephalitis
Abscess of brain...
Congestion of brain
Other Diseases	7	...	7	...	41	...
Sub-section 2.—Nervous Disorders and Diseases of Undetermined Nature:—							
Apoplexy	1	1
Paralysis	1	...	1	...	...	...
Chorea
Epilepsy	1	...	1	...	3	...
Neuralgia...	2	...	2	...	57	...
Hysteria	1	...
Other Diseases	21	...	21	...	80	...
Sub-section 3.—Mental Diseases:—							
Idiocy
Mania	1	...	1	...	...	...
Melancholia
Dementia	1	...	1	1	...	...
Delusional Insanity	2	...	2	...	...	...
Other Diseases	3	1	3	...	4	...
DISEASES OF THE EYE.							
Conjunctivitis	1	...	1	...	43	...
Keratitis
Ulceration of cornea	1	...
Iritis	2	...	2	...	4	...
Optic neuritis
Cataract
Other Diseases	1	...	1	...	19	...
Carried forward

TABLE IV.—RETURN OF DISEASES AND DEATHS OF EUROPEANS
FOR THE YEAR 1924—*continued*.

Diseases.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1923.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1924.	TOTAL.	
		Admis- sions.	Deaths.			Cases treated.	Deaths.
Local Diseases— contd.							
Brought forward
DISEASES OF THE EAR.							
Inflammation	5	...	5	...	40	...
Other Diseases	87	...
DISEASES OF THE NOSE.							
Inflammation	1	...	1	...	15	...
Other Diseases	75	...
DISEASES OF THE CIR- CULATORY SYSTEM.							
Pericarditis
Endocarditis	1	...	1	...	1	...
Valvular Disease:—							
(1) Mitral	3	1	3	...	5	...
(2) Aortic	1	1	1	...	4	...
(3) Tricuspid	1	...
(4) Pulmonary
Arterial sclerosis	1	...	1	...	3	...
Aneurism
Other Diseases	6	1	6	1	16	...
DISEASES OF THE RESPIRA- TORY SYSTEM.							
Laryngitis	4	...	4	...	25	...
Bronchitis	17	...	17	...	188	...
Broncho-pneumonia	2	...	2	...	...	...
Abscess of Lung
Gangrene of Lung
Emphysema
Pleurisy	5	...	5	1	9	...
Empyema
Other Diseases	6	1	6	...	43	..
DISEASES OF THE DIGES- TIVE SYSTEM.							
Stomatitis	2	...	2	...	27	...
Caries of teeth	2	...	2	...	84	...
Pyorrhœa alveolaris	14	...
Glossitis	4	...
Sore throat	3	...	3	...	68	...
Inflammation of tonsils	12	...	12	...	59	...
Gastritis	19	...	19	2	188	...
Ulceration of stomach	3	...
Hæmatemesis	1	...
Dilatation of stomach	2	...	2	...	...	...
Stricture of stomach
Dyspepsia	8	...	8	1	187	..
Enteritis ...	1	15	...	16	2	44	...
Appendicitis	10	...	10	...	7	...
Colitis	6	...	6	...	18	...
Ulceration of intestines	2	...	2	...	...	...
Sprue
Hernia	6	...	6	1	6	...
Diarrhœa	12	...	12	...	160	...
Carried forward

TABLE IV.—RETURN OF DISEASES AND DEATHS OF EUROPEANS
FOR THE YEAR 1924—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1923.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1924.	TOTAL.	
		Admis- sions.	Deaths.			Cases treated.	Deaths.
Local Diseases— <i>contd.</i>							
Brought forward
Constipation	2	...	2	...	55	...
Colic	2	...	2	...	37	..
Hæmorrhoids	8	...	8	...	40	...
Pancreatitis	2	...
Hepatitis—Acute ...	1	9	...	10	...	23	...
Abscess	3	...	3	...	1	...
DISEASES OF THE DIGESTIVE SYSTEM— <i>continued.</i>							
Cirrhosis	1	...	1	...	...	...
Jaundice	4	...	4	...	6	...
Peritonitis
Ascites
Other Diseases	14	...	14	...	44	1
DISEASES OF THE LYMPHA- TIC SYSTEM.							
Splenitis	4	...
Inflammation of lymphatic gland ...	1	7	...	8	2	41	...
Suppuration of lymphatic gland	1	...	1	1	20	...
Lymphangitis	4	...
Elephantiasis
Other Diseases	1	...	1	...	1	...
DISEASES OF THE URINARY SYSTEM.							
Acute nephritis	3	...	3	...	4	...
Bright's Disease...
Pyelitis	1	...
Calculus	2	...
Renal colic	11	...	11	...	19	...
Cystitis
Vesical calculus...	1	...
Suppression
Hæmaturia
Chyluria
Other Diseases	1	...	1	...	7	...
DISEASES OF THE GENERA- TIVE SYSTEM.							
Male Organs:—							
Urethritis...	...	1	...	1	...	18	...
Gleet	10	...
Stricture	2	...	2	...	4	...
Prostatitis	10	...
Soft chancre	1	...	1	...	21	...
Condyloma
Inflammation of scrotum
Hydrocele	1	...	1	...	1	...
Orchitis	2	...	2	...	7	...
Epididymitis	3	...	3	...	9	...
Abscess of testicle	2	...	2	...	...	...
Other Diseases ...	1	9	...	10	...	8	...
Carried forwrrd

TABLE IV.—RETURN OF DISEASES AND DEATHS OF EUROPEANS
FOR THE YEAR 1924—*continued*.

Diseases.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1923.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1924.	TOTAL.	
		Admis- sions.	Deaths.			Cases treated.	Deaths.
Local Diseases—<i>contd.</i>							
Brought forward ...	...	...	...	...	...	...	...
DISEASES OF THE GENERA- TIVE SYSTEM—<i>continued</i>.							
Female Organs:—							
Ovaritis ... ..	...	...	...	...	...	...	...
Ovarian cyst ... ..	...	1	...	1	...	1	...
Endometritis ... ..	...	...	...	...	...	...	...
Displacement of uterus	...	...	...	...	...	...	...
Vaginitis ... ..	...	...	...	...	...	...	...
Amenorrhœa ... ..	...	...	...	...	...	...	...
Dysmonorrhœa ... ..	...	...	...	...	...	...	...
Menorrhagia ... ..	...	2	...	2	...	4	...
Leucorrhœa ... ..	...	...	...	...	...	...	...
Other Diseases ... ..	...	1	...	1	...	4	...
AFFECTIONS CONNECTED WITH PREGNANCY.							
Abortion ... ..	...	3	...	3	...	1	...
Other Affections ... ..	...	1	...	1	1	2	...
AFFECTIONS CONNECTED WITH PARTURITION.							
Delayed Labour ... ..	...	...	...	...	...	...	...
Retained placenta ... ..	...	...	...	...	...	...	...
Premature Birth ... ..	...	...	...	...	...	...	...
Other Affections ... ..	...	1	...	1	...	...	...
AFFECTIONS CONSEQUENT ON PARTURITION.							
Post-partum hæmorrh- age ... ..	...	...	...	...	...	...	...
Puerperal septicæmia ... ..	...	...	...	...	...	...	...
Mastitis ... ..	...	...	...	...	...	2	...
Abscess of breast ... ..	...	...	...	...	...	...	...
Other Affections ... ..	...	...	...	...	...	...	...
DISEASES OF ORGANS OF LOCOMOTION.							
Osteitis ... ..	...	4	...	4	...	3	...
Arthritis ... ..	...	4	...	4	...	34	...
Spondylitis ... ..	...	...	...	...	...	...	...
Bursitis ... ..	...	...	...	...	...	5	...
Myalgia ... ..	...	6	...	6	...	65	...
Other Diseases ... ..	...	8	...	8	...	46	...
DISEASES OF CONNECTIVE TISSUE.							
Cellulitis	2	12	...	14	...	42	...
Abscess ... ..	...	17	...	17	1	47	...
Other Diseases ... ..	...	3	...	3	...	5	...
Carried forward ...	...	...	...	...	...	...	...

TABLE IV.—RETURN OF DISEASES AND DEATHS OF EUROPEANS
FOR THE YEAR 1924—*continued*.

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1923.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1924.	TOTAL.		
		Admis- sions.	Deaths.			Cases treated.	Deaths.	
Local Diseases—contd.								
Brought forward	
DISEASES OF THE SKIN.								
Ulcer	11	...	11	...	100	...	
Urticaria	1	...	1	...	25	...	
Eczema	1	...	1	...	56	...	
Boil...	6	...	6	...	95	...	
Carbuncle	1	...	1	...	4	...	
Herpes	1	...	1	...	23	...	
Psoriasis	5	...	
Oriental sore	
Tinea	105	...	
Scabies	1	...	1	...	19	...	
Acne	26	...	
Prickly heat	37	...	
Other Diseases	6	...	6	...	80	...	
INJURIES.								
General	3	2	3	...	2	...	
Local	54	1	54	1	372	...	
TUMOURS.								
Benign	1	...	1	...	16	...	
Malignant	1	1	1	...	1	...	
MALFORMATIONS	1	...	...	1	...	1	...
POISONS.								
Vegetable	1	...	1	...	1	...	
Animal	2	...	
Other Poisons	3	...	3	...	4	...	
PARASITES.								
ANIMAL PARASITES.								
Protozoa	
Trematoda (Flukes)	
Cestoda :—								
Tænia solium	4	...	
Tænia sagninata...	2	...	2	...	10	...	
Other Cestodes	1	...	
Nematoda :—								
Ascaris	2	...	
Tricocephalus dispar	
Trichina	
Dracunculus	
Filaria	5	...	
Strongylus	
Ankylostomum	
Oxyuris	3	...	
Other Nematodes	
Insecta :—								
Insects producing myiasis	2	...	
Dematophilus penetrans	3	...	
Other Insects	15	...	
Total	18	902	24	920	23	4,839	9	

TABLE V.

RETURN OF DISEASES AND DEATHS (NATIVE) FOR
THE YEAR 1924.

Diseases.	*IN-PATIENTS.					OUT-PATIENTS.	
	† Remaining in Hospital at end of 1923.	TOTAL.		† Total cases treated.	§ Remaining in Hospital at end of 1924.	TOTAL.	
		Admis- sions.	Deaths.			Cases treated.	Deaths.
Infective Diseases.							
Beri-Beri	1	9	2	10	4	1	...
Cercbro-Spinal Fever ...	10	369	244	379	...	11	...
Chicken Pox	42	1,075	...	1,117	13	381	...
Cholera ... ..	...	...	...	...	...	...	...
Dengue ... ..	...	3	...	3	...	1	...
Diphtheria ... ..	...	1	...	1	...	...	...
Dysentery :—							
(a) Amœbic	20	828	93	848	7	1,003	3
(b) Bacillary	3	12	5	15	...	18	...
(c) Type not determined	1	127	...	128	...	76	1
Endocarditis-infective ...	...	2	...	2	...	...	...
Enteric ... ..	...	5	1	5	1	1	...
Erysipelas ... ..	...	1	...	1	...	2	...
Gonorrhœa	43	705	3	748	45	3,354	...
Influenza	4	338	16	342	1	630	...
Kala-Azar ... ..	...	...	...	...	...	...	...
Leprosy :—							
(a) Nodular	188	191	3	379	133	73	...
(b) Anaesthetic	194	245	22	439	203	147	...
Malaria :—							
(a) Tertian	1	29	2	30	...	68	...
(b) Quartan ... ..	...	32	...	32	2	119	...
(c) Aestivo-autumnal ...	16	1,579	38	1,595	50	13,535	6
(d) Chronic ... ..	...	27	...	27	...	582	...
(e) Type not determined	3	236	1	239	4	1,830	...
Blackwater Fever ... ..	...	3	...	3	...	4	...
Measles... ..	1	24	...	25	...	48	1
Papataci Fever ... ..	...	...	...	...	...	...	...
Plague ... ..	...	144	74	144	2	...	270
Pneumonia	27	731	175	758	24	310	6
Pyrexia of uncertain origin...	...	69	4	69	1	363	...
Rabies ... ..	...	...	...	...	...	...	...
Relapsing Fever ... ..	...	622	83	622	32	101	6
Rheumatic Fever	1	30	5	31	2	78	...
Septicaemia	1	25	22	26	...	8	...
Small-pox	4	111	18	115	3	6	1
Syphilis (a) Primary ...	13	141	4	154	6	295	...
(b) Secondary|| ...	45	333	8	378	28	1,071	...
(c) Inherited	2	31	...	33	6	63	1
Tetanus... ..	2	46	28	48	1	20	...
Trypanosomiasis (Sleeping Sickness)	3	24	8	27	2	12	...
Tuberculosis	9	188	88	197	10	151	1
Undulant Fever ... ..	...	...	...	...	...	...	...
Whooping Cough ... ..	...	1	...	1	...	112	...
Yaws	1	218	...	219	16	1,654	...
Yellow Fever ... ..	...	...	...	...	...	1	1
Other Diseases ... ..	...	26	...	26	1	89	...
Intoxications.							
Alcoholism ... ..	...	1	1	1	...	...	...
Morphinism ... ..	...	...	...	...	...	...	...
Other Intoxications ... ..	...	...	...	...	...	...	...
Carried forward ... ..	...	...	...	...	...	...	...

The form shows in the main the arrangement of diseases in the Nomenclature of the Royal College of Physicians, 1906 Edition.

* In-patients are those treated in Hospitals and Institutions, and the term does not apply to those treated in their own quarters, even though they would ordinarily be in-patients if there were suitable accommodation.

† "Total cases treated" will, of course, include those remaining in Hospital at the end of the previous year.

‡ i.e., the year previous to that for which the return is made.

§ The figures in this column to be carried on to the next year's return.

|| "Tertiary Syphilis" is a term sometimes applied to the later symptoms.

Note: Diseases not enumerated in this table should be entered as "Other Diseases" under their appropriate headings, and should not be specified.

279 deaths from Plague only seen at p.m. Total cases Plague 414. Total deaths from Plague 344.

TABLE V.—RETURN OF DISEASES AND DEATHS OF NATIVES
FOR THE YEAR 1924—*continued*.

Diseases.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1923.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1924.	TOTAL.	
		Admis- sions.	Deaths.			Cases treated.	Deaths.
General Diseases.							
Brought forward	...	...	...	...	...	...	...
Anæmia	3	71	10	74	5	1,825	5
Anæmia-Pernicious	...	1	1	1	...	...	...
Diabetes	...	3	2	3	...	11	...
Exophthalmic goitre...	...	...	...	...	...	20	...
Gout	...	...	...	...	...	2	...
Leucocythæmia	...	...	...	...	...	...	...
Lymphadenoma	...	2	1	2	...	...	...
Myxœdema	...	...	...	...	...	...	...
Purpura...	...	...	...	...	...	3	...
Rickets...	...	...	...	...	...	3	...
Scurvy	...	...	...	...	...	3	...
Other Diseases	1	56	2	57	2	1,501	1
Local Diseases.							
DISEASES OF THE NERVOUS SYSTEM.							
Sub-section 1.—Diseases of the Nerves:—							
Neuritis	2	56	1	58	...	222	...
Meningitis	2	38	14	40	...	3	...
Myelitis	...	5	4	5	...	2	...
Hydrocephalus	...	...	...	...	...	...	...
Encephalitis	...	3	3	3	...	...	...
Abscess of brain	...	1	1	1	...	...	...
Congestion of brain	...	...	...	...	...	7	...
Other Diseases	1	14	5	15	...	42	...
Sub-section 2.—Nervous Disorders and Diseases of Undetermined Nature:—							
Apoplexy	...	6	2	6	...	11	...
Paralysis	1	44	9	45	12	44	1
Chorea	...	...	...	...	...	1	...
Epilepsy	1	26	...	27	1	81	...
Neuralgia	2	248	...	250	...	2,730	...
Hysteria	...	5	...	5	...	9	...
Other Diseases	1	33	5	34	1	363	1
Sub-section 3.—Mental Diseases:—							
Idiocy	...	...	...	...	...	4	...
Mania	6	8	2	14	7	1	...
Melancholia	8	4	...	12	7	1	...
Dementia	2	9	1	11	1	8	...
Delusional Insanity	3	5	1	8	2	6	...
Other Diseases	...	5	...	5	1	2	...
DISEASES OF THE EYE.							
Conjunctivitis	4	138	...	142	2	3,716	...
Keratitis	...	14	...	14	1	92	...
Ulceration of cornea	...	10	...	10	...	59	...
Iritis	1	20	...	21	2	99	...
Optic neuritis	...	2	...	2	...	25	...
Cataract	1	11	...	12	...	76	...
Other Diseases	2	28	...	30	1	602	...
DISEASES OF THE EAR.							
Inflammation	2	29	...	31	...	2,150	...
Other Diseases	...	9	...	9	...	561	...
Carried forward	...	...	...	...	...	...	...

TABLE V.—RETURN OF DISEASES AND DEATHS OF NATIVES FOR
THE YEAR 1924—*continued*.

Diseases.	IN-PATIENTS.						OUT-PATIENTS.	
	Remaining in Hospital at end of 1923.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1924.	TOTAL.		
		Admis- sions.	Deaths.			Cases treated.	Deaths.	
Local Diseases—contd.								
Brought forward ...	...	...	...	...	...	...	...
DISEASES OF THE NOSE.								
Inflammation ... ..	...	3	1	3	...	57	...
Other Diseases ... ..	...	2	...	2	...	152	...
DISEASES OF THE CIRCULATORY SYSTEM.								
Pericarditis ... ..	...	12	9	12	...	9	...
Endocarditis ... ..	...	3	2	3	...	10	...
Valvular Disease:—								
(1) Mitral ... ..	...	72	19	72	5	222	...
(2) Aortic	10	33	5	43	...	47	...	
(3) Tricuspid ... ..	...	...	...	...	...	3	...
(4) Pulmonary ... ..	...	...	...	...	...	...	...
Arterial sclerosis ... ..	...	2	2	2	...	9	...
Aneurism ... ..	...	6	1	6	...	67	...
Other Diseases	3	55	13	58	...	88	1	
DISEASES OF THE RESPIRATORY SYSTEM.								
Laryngitis ... ..	...	25	...	25	1	329	...
Bronchitis	18	1,083	25	1,101	19	18,303	1	
Broncho-pneumonia	5	289	32	294	2	90	1	
Abscess of Lung... ..	...	1	...	1	...	...	...
Gangrene of Lung ... ..	...	...	...	...	...	1	...
Emphysema ... ..	...	...	...	...	...	2	...
Pleurisy	4	101	6	105	2	327	...	
Empyema... ..	...	7	1	7	...	...	...
Other Diseases ... ..	...	25	4	25	3	335	...
DISEASES OF THE DIGESTIVE SYSTEM.								
Stomatitis ... ..	...	22	...	22	...	923	...
Caries of teeth ... ..	...	70	...	70	...	1,721	...
Pyorrhœa alveolaris ... ..	...	2	...	2	...	184	...
Glossitis ... ..	...	5	...	5	...	335	...
Sore throat ... ..	...	7	...	7	...	254	...
Inflammation of tonsils ... ..	...	35	...	35	...	398	...
Gastritis ... ..	...	118	6	118	1	734	...
Ulceration of stomach ... ..	...	3	...	3	...	5	...
Hæmatemesis ... ..	...	2	...	2	...	1	...
Dilatation of stomach ... ..	...	1	...	1	...	15	...
Stricture of stomach ... ..	...	1	1	1	...	...	...
Dyspepsia.. ... ..	...	34	...	34	...	2,425	...
Enteritis	2	85	14	87	...	607	2	
Appendicitis ... ..	...	16	...	16	3	12	...
Colitis ... ..	...	59	11	59	2	235	...
Ulceration of intestines ... ..	...	1	1	1	...	1	...
Sprue ... ..	...	...	...	...	...	2	...
Hernia	27	554	26	581	48	462	...	
Diarrhœa	16	958	60	974	2	3,189	4	
Constipation ... ..	...	46	...	46	...	12,872	...
Colic ... ..	...	158	...	158	...	3,175	1
Hæmorrhoids	1	45	...	46	1	358	...	
Carried forward ...	...	...	...	...	...	...	...

TABLE V.—RETURN OF DISEASES AND DEATHS OF NATIVES FOR
THE YEAR 1924—*continued*.

Diseases.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1923.	TOTAL.		Total Cases treated.	Remaining in Hospital at end of 1924.	TOTAL.	
		Admis- sions.	Deaths.			Cases treated.	Deaths.
Local Diseases— <i>contd.</i>							
Brought forward ...	..	...	...	...	...	...	...
DISEASES OF THE DIGESTIVE SYSTEM— <i>continued.</i>							
Pancreatitis ... ..	...	...	...	...	...	...	...
Hepatitis—Acute ...	2	53	3	55	1	92	...
Abscess	1	18	4	19	2	25	...
Cirrhosis	1	31	15	32	...	29	...
Jaundice	1	180	33	181	1	59	...
Peritonitis ... ..	...	22	3	22	1	22	...
Ascites	1	45	10	46	5	35	...
Other Diseases	1	90	23	91	4	445	1
DISEASES OF THE LYMPHATIC SYSTEM.							
Splenitis ... ..	...	14	2	14	...	513	...
Inflammation of lymphatic gland	11	182	2	193	5	1,247	...
Suppuration of lymphatic gland	3	96	1	99	5	294	...
Lymphangitis ... ..	...	5	...	5	...	52	...
Elephantiasis	7	115	6	122	13	105	...
Other Diseases	6	11	1	17	2	33	2
DISEASES OF THE URINARY SYSTEM.							
Acute nephritis ... ..	...	38	14	38	1	45	1
Bright's Disease ...	1	8	6	9	...	12	...
Pyelitis ... ..	...	...	...	...	...	...	...
Calculus ... ..	...	...	...	...	...	...	...
Renal colic ... ..	...	1	...	1	...	5	...
Cystitis	2	51	1	53	2	233	1
Vesical calculus ... ..	...	...	...	...	...	...	...
Suppression	1	1	...	2	...	7	...
Hæmaturia	1	7	2	8	...	21	...
Chyluria ... ..	...	...	...	...	...	...	...
Other Diseases	1	29	...	30	2	164	...
DISEASES OF THE GENERATIVE SYSTEM.							
Male Organs:—							
Urethritis	1	14	...	15	...	98	...
Gleet ... ..	...	10	...	10	...	94	...
Stricture	8	106	6	114	10	248	...
Prostatitis ... ..	...	1	...	1	...	8	...
Soft chancre	2	70	...	72	1	241	...
Condyloma	3	...	...	3	...	2	...
Inflammation of scrotum	...	15	...	15	1	32	...
Hydrocele	15	165	1	180	19	186	...
Orchitis	1	106	...	107	1	264	...
Epididymitis	1	35	...	36	1	79	...
Abscess of testicle ...	...	9	...	9	1	5	...
Other Diseases	9	91	1	103	16	274	...
Carried forward ...	..	...	...	...	...	...	...

TABLE V.—RETURN OF DISEASES AND DEATHS OF NATIVES FOR
THE YEAR 1924—*continued*.

Diseases.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1923.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1924.	TOTAL.	
		Admis- sions.	Deaths.			Cases treated.	Deaths.
Local Diseases—contd.							
Brought forward ...	...	...	...	...	...	...	...
Female Organs:—							
Ovaritis .. ...	...	2	...	2	...	28	...
Ovarian cyst ...	3	6	...	9	...	3	...
Endometritis ...	...	21	...	21	...	87	...
Displacement of uterus ...	...	1	...	1	...	20	...
Vaginitis ...	3	9	1	12	4	91	...
Amenorrhœa ...	...	2	...	2	...	72	...
Dysmenorrhœa ...	...	5	...	5	...	178	...
Menorrhagia ...	1	6	...	7	...	60	...
Leucorrhœa ...	...	1	...	1	...	49	...
Other Diseases ...	1	52	12	53	2	222	...
AFFECTIONS CONNECTED WITH PREGNANCY.							
Abortion ...	1	25	2	26	...	51	...
Other Affections ...	...	7	...	7	...	75	...
AFFECTIONS CONNECTED WITH PARTURITION.							
Delayed Labour ...	6	36	14	42	1	17	...
Retained placenta ...	...	9	1	9	...	7	1
Premature Birth ...	...	...	...	...	...	8	...
Other Affections ...	...	2	...	2	...	12	...
AFFECTIONS CONSEQUENT ON PARTURITION.							
Post-partum hæmorrhage ...	1	...	...	1	...	1	...
Puerperal septicæmia ...	...	6	3	6	...	2	...
Mastitis ...	1	11	...	12	...	98	...
Abscess of breast ...	...	1	...	1	...	20	...
Other Affections ...	...	3	1	3	...	5	...
DISEASES OF ORGANS OF LOCOMOTION.							
Osteitis ...	4	42	1	46	3	289	...
Arthritis ...	14	424	3	438	10	2,608	1
Spondylitis ...	...	...	...	...	...	1	...
Bursitis ...	...	16	...	16	...	65	...
Myalgia ...	9	467	2	476	9	7,952	...
Other Diseases ...	6	160	1	166	10	2,299	1
DISEASES OF CONNECTIVE TISSUE.							
Cellulitis ...	11	324	6	335	8	2,076	1
Abscess ...	37	803	15	840	26	3,187	...
Other Diseases ...	4	20	1	24	1	118	...
Carried forward ...	...	...	...	...	...	...	...

TABLE V.—RETURN OF DISEASES AND DEATHS OF NATIVES FOR
THE YEAR 1924—*continued*.

Diseases.	IN-PATIENTS.					OUT-PATIENTS.	
	Remaining in Hospital at end of 1923.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1924.	TOTAL.	
		Admis- sions.	Deaths.			Cases treated.	Deaths.
Local Diseases—contd.							
Brought forward ...	...	...	...	...	...	...	56
DISEASES OF THE SKIN.							
Ulcer ...	57	1,652	14	1,709	83	20,676	...
Urticaria ...	..	9	...	9	...	329	...
Eczema ...	2	87	...	89	1	2,299	...
Boil ...	13	90	...	103	4	1,557	...
Carbuncle ...	...	7	...	7	...	55	...
Herpes ...	...	6	...	6	...	97	...
Psoriasis ...	...	...	...	...	...	25	...
Oriental sore ...	...	...	...	...	...	70	...
Tinea ...	...	28	...	28	...	2,865	...
Scabies ...	...	58	...	58	...	2,659	...
Acne ...	...	...	...	...	...	28	...
Prickly heat ...	...	1	...	1	1	35	...
Other Diseases ...	3	100	4	103	7	1,494	1
INJURIES.							
General ...	18	159	18	177	13	362	...
Local ...	99	1,746	66	1,845	80	25,320	...
TUMOURS.							
Benign ...	1	123	2	124	5	339	...
Malignant ...	2	39	13	41	3	30	...
MALFORMATIONS ...	...	10	...	10	...	10	...
POISONS.							
Vegetable ...	...	8	...	8	...	3	...
Animal ...	...	19	1	19	1	54	...
Other Poisons ...	1	10	3	11	...	24	...
PARASITES.							
ANIMAL PARASITES.							
Protozoa ...	...	1	...	1	...	13	...
Trematoda (Flukes) ...	3	56	...	59	1	33	...
Cestoda :—							
Tænia solium ...	...	80	...	80	1	466	...
Tænia saginata ...	...	39	...	39	...	2,435	...
Other Cestodes ...	...	8	...	8	3	25	...
Nematoda :—							
Ascaris ...	2	74	...	76	...	5,127	...
Tricocephalus dispar ...	...	...	...	...	...	236	...
Trichina ...	...	...	...	...	...	...	...
Dracunculus ...	19	395	1	414	9	982	...
Filaria ...	...	41	1	41	...	267	...
Strongylus ...	...	...	...	...	...	2	...
Ankylostomum ...	13	208	15	221	2	777	1
Oxyuris ...	...	1	...	1	...	19	...
Other Nematodes ...	...	18	...	18	...	24	...
Insecta :—							
Insects producing myiasis ...	...	...	...	...	...	...	...
Dematophilus penetrans ...	...	3	...	3	...	97	...
Other Insects ...	...	4	...	4	...	135	...
Total ...	1,179	22,590	1,591	23,769	1,113	182,101	58

APPENDIX A.

EUROPEANS

CASE INCIDENCE AND CASE MORTALITY.

Disease.	Incidence per 1,000 Sick treated.	Mortality %
Anæmia	37·2	...
Blackwater Fever	4·18	50%
Dysentery	15·50	1·14%
Influenza	33·93	...
Malaria	190·91	·18
Pneumonia	3·13	11·11
Tuberculosis	2·96	5·99
Gonorrhœa	20·20	..
<i>Venereal Disease.</i>		
Syphilis	5·22	...

NATIVES

CASE INCIDENCE AND MORTALITY.

Disease.	Incidence per 1,000 Sick treated.	Mortality %
Anæmia	9·22	4·21
Ankylostomiasis	1·08	7·17
Diarrhœa	20·22	1·51
Dysentery	5·13	9·56
Influenza	4·72	1·64
<i>Venereal</i> { Gonorrhœa	19·92	·07
{ Syphilis	9·68	·65
Malaria	87·70	·26
Pneumonia	5·18	16·94
Tuberculosis	1·68	25·57

AFRICAN OFFICIALS

CAUSES OF INVALIDINGS.

Myocardial Degeneration	1
Dilatation and Hypertrophy of the Heart	1
Pulmonary Tuberculosis	1
Trachoma (+ Myocarditis)	1
Syphilis	1
Hepatic Cirrhosis	1
Senile Debility	2
Osteo—Arthritis	1
Glaucoma	1
Mental Debility	1
Cataract (+ Neuralgia)	1
Chronic Ulcer	1
Total	13

CAUSES OF DEATHS.

Diarrhœa	1
Pneumonia	5
Chronic Interstitial Nephritis	1
Cerebral Haemorrhage	1
Cardiac Failure	1
Drowning	1
Smallpox	1
Total	11

APPENDIX.

TABLE SHOWING CAUSES OF INVALIDINGS AND DEATHS—EUROPEAN
NON-OFFICIALS.

Diseases.	1922.		1923.		1924.	
	Invalided.	Died.	Invalided.	Died.	Invalided.	Died.
INFECTIVE DISEASES:—						
Blackwater Fever	2	2	8	2	2	9
Dengue ... ..	...	...	...	...	...	...
Dysentery ... ..	...	...	...	...	5	2
Dysentery—Amoebic	2	1	2	...	...	...
„ Bacillary	1	...	...	...	...	...
Enteric ... ..	...	...	2	1	...	...
Erysipelas .. ...	...	1	...	...	...	...
Hyperpyrexia ... ..	...	...	...	1	...	...
Influenza ... ..	...	...	...	1	...	...
Malaria	8	4	12	1	10	2
Paratyphoid ... ..	...	...	...	...	...	...
Pneumonia... ..	...	4	1	...	...	...
Pyæmia ... ..	...	...	1	...	...	...
Rheumatism ... ..	...	...	...	...	1	...
Small-Pox ... ..	...	...	1	...	...	1
Syphilis	2	...	...	...	1	...
Trypanosomiasis ... ..	...	...	...	...	1	...
Tuberculosis	3	2	2	2	1	1
Yellow Fever ... ..	...	1	...	...	...	1
INTOXICATIONS:—						
Alcoholism ... ..	...	...	1	...	3	...
Drug Habit ... ..	...	...	...	...	...	...
GENERAL DISEASES:—						
Anæmia	3	...	1	...	...	...
Debility ... ..	...	...	1	...	1	...
Diabetes ... ..	...	1	...	1	...	...
Splenic Anæmia ... ..	...	...	...	...	1	...
NERVOUS SYSTEM:—						
Cerebral Abscess ... ..	...	...	...	...	...	1
Cerebral Hæmorrhage	1	1	...	...	...	...
Heat Apoplexy ... ..	...	...	...	...	1	...
Hysteria ... ..	...	...	...	...	1	...
Insomnia ... ..	...	...	...	...	1	...
Melancholia ... ..	...	1	...	...	...	...
Meningitis ... ..	...	1	...	...	...	...
Neuralgia ... ..	...	...	...	...	1	...
Neurasthenia	3	...	2	...	9	...
Neuritis ... ..	...	...	...	...	...	...
Peripheral Neuritis ... ..	...	...	1	...	...	...
Polio. Encephalitis ... ..	...	...	1	...	...	...
Purulent Meningitis ... ..	...	...	...	...	...	1
Other diseases	2	...	...	...	...	...
DISEASES OF EAR:—						
Inflammation ... ..	...	...	...	...	1	...
Otitis media	1	...	...	...	...	...
CIRCULATORY SYSTEM:—						
Arteria-Sclerosis ... ..	...	...	...	...	...	...
D. A. H. ... ..	...	...	1	...	...	...
Myocarditis ... ..	...	...	...	...	...	...
V. D. H.	2	1	1	...	...	1

APPENDIX.

TABLE SHOWING CAUSES OF INVALIDINGS AND DEATHS—EUROPEAN
NON-OFFICIALS—*continued.*

Diseases.	1922.		1923.		1924.	
	Invalided.	Died.	Invalided.	Died.	Invalided.	Died.
VALVULAR DISEASES:—						
Malaria and Cardiac	1
RESPIRATORY SYSTEM:—						
Asthma	1	...	...	...
Bronchitis	1	...
Congestion Lungs	1	...	...	...	...
Empyema
Hæmoptysis
Pleurisy	1	...	2	...	...	...
DIGESTIVE SYSTEM:—						
Abscess	1	...
Appendicitis	3	2	1	1	3	...
Ascites	1	...
Cirrhosis of Liver	1	...
Colitis	1	...
Duodenal Ulcer	1	...	...	...	...
Fistula	1	...
Gallstones	1	...	...	...
Gastritis	3	...	3	...	...	...
Hepatic Abscess	1	...
Hepatitis	2	...	2	...	1	...
Hyperemesis Gravidarum	1	...
Intestinal Inflammation...	1	...	...	...	...
Pancreatitis	1	...
Pyorrhœa Alveolaris	1	...	...	...
Tonsillitis	1	...	...	...
Ulceration of Throat	1	...
LYMPHATIC SYSTEM:—						
Rupture Spleen	1
Suppuration Lymphatic Gland...
URINARY SYSTEM:—						
Cystitis	1	...	...	...
Hæmoglobinuria
Nephritis	1	1	...	...
Renal Calculus	1	...
Ureteral Calculus	1	...	...	...
GENERATIVE SYSTEM:—						
Hydrocele	1	...
Ovaritis	1	...	...	...
Pregnancy	1	...	...	...	...
Premature Birth	1	...	...	...	...
Salpingitis
INJURIES:—						
Compiund Fracture	1	...
Drowning
Fracture Pelvis	1	...
Fracture Skull	1
General	1
Gun Shot Wound	1	...	...
General Injury	1	...	1	...	...
Injuries	2	...
Local Injury	1	...	...	...	...	...
Nicrosis of Bone	1	...
LOCOMOTION:—						
Arthritis	1	...	...	...

APPENDIX.

TABLE SHOWING CAUSES OF INVALIDINGS AND DEATHS—EUROPEAN
NON-OFFICIALS—*continued.*

Diseases.	1922.		1923.		1924.	
	Invalided.	Died.	Invalided.	Died.	Invalided.	Died.
CONNECTIVE TISSUE:—						
Abscess
Septic Fingers
SKIN:—						
Boils	1	...	...	...	...	...
Carbuncle	1	...	...	...	...
Dermatitis	1	...	...	...
Eczema
OTHER CAUSES:—						
Sunstroke	1	...	...	...	...
Violent Fright
Unknown	1	...	...	...	...
Total	41	31	57	13	61	23

TABLE OF SURGICAL OPERATIONS.

	1922.		1923.		1924.	
Total Number	2,503	...	4,201	...	3,485
Number Cured	2,007	...	3,579	...	2,874
Relieved	410	...	517	...	496
Not Relieved	51	...	41	...	43
Number of Deaths...	...	35	...	64	...	74

APPENDIX.

TABLE SHOWING CAUSES OF INVALIDINGS AND DEATHS—EUROPEAN OFFICIALS.

Disease.	1922.		1923.		1924.	
	Invalided.	Died.	Invalided.	Died.	Invalided.	Died.
INFECTIVE DISEASES:—						
Dysentery	2	...	1	...	2	...
Enteric	1	...	...	...	...	...
Influenza ... ..	...	...	1	...	1	...
Malaria	16	2	7	...	14	2
Blackwater	14	...	5	4	3	5
Pneumonia... ..	...	...	...	...	...	...
Pyrexia uncertain Origin ...	1	...	2	...	2	...
Rheumatic Fever ... ..	...	...	1	...	...	...
Septicæmia ... ..	...	...	...	1	...	...
Syphilis	1	...	1	...	...	...
Trypanosomiasis ... ..	...	...	1	...	1	...
Tuberculosis	2	...	7	...	3	...
Yellow Fever ... ..	...	...	...	...	...	1
Other Diseases ... ..	...	...	1	...	...	...
INTOXICATIONS:—						
Alcoholism	3	...	4	2	3	...
Sun Trauma	1	1	...	...	...	...
GENERAL DISEASES:—						
Anæmia	14	...	25	...	14	...
Diabetes	1	...	...	...	...	...
Gout ... ..	...	...	...	...	2	...
Tropical Debility	9	...	11	...	...	...
Other Diseases ... ..	...	...	2	...	...	...
NERVOUS SYSTEM:—						
Acute Mania ... ..	...	...	...	...	...	...
Apoplexy ... ..	...	...	...	...	...	...
Delusional Insanity	1	...	1	...	...	...
Encephalitis	1	...	...	...	1	...
Headache ... ..	...	...	3	...	4	...
Insomnia	2	...	...	...	...	...
Melancholia	1	...	2	...	...	...
Nervous Exhaustion ... ..	...	...	...	...	...	1
Neuralgia	1	...	...	...	1	...
Neurasthenia	21	...	23	...	18	...
Neuritis	3	...	5	...	...	...
Paralysis	2	...	...	...	1	...
Peripheral Neuritis ... ..	...	...	...	...	...	...
Sciatica ... ..	...	...	...	...	...	...
DISEASES OF THE EYE:—						
Cataract ... ..	...	...	1	...	1	...
Defective Vision	1	...	...	...	...	...
Iritis ... ..	...	...	1	...	1	...
Retinitis ... ..	...	...	...	...	1	...
DISEASES OF THE EAR:—						
Inflammation of Ear ... ..	...	...	1	...	1	...
Otitis Media	2	...	...	...	...	...

APPENDIX.

TABLE SHOWING CAUSES OF INVALIDINGS AND DEATHS—EUROPEAN
OFFICIALS—*continued.*

Disease.	1922.		1923.		1924.	
	Invalided.	Died.	Invalided.	Died.	Invalided.	Died.
DISEASES OF THE NOSE:—						
Coryza	1	...	...	...	...	...
CIRCULATORY SYSTEM:—						
Angina Pectoris ... ..	...	...	...	1	...	...
Aneurism ... ..	...	...	1	...	...	...
Arterio-Sclerosis	1	...	...	1	...	...
Cardiac Dilatation	1	...	1	...	...	...
D. A. H. ... ..	...	...	1	...	...	...
Myocarditis	1	...	2	...	...	...
Phlebitis ... ..	...	...	1	...	...	...
Syncope ... ..	...	...	...	1	...	...
Thrombosis ... ..	...	...	1	...	1	...
V. D. H.	3	...	...	1	2	...
Varix ... ..	...	...	1	...	...	...
LYMPHATIC SYSTEM:—						
Adenitis ... ..	...	...	...	...	...	...
Inflam; Lymphatic Glands ... ..	...	...	...	...	2	...
Suppuration Lymph Glands	1	...	...	...	...	...
RESPIRATORY SYSTEM:—						
Asthma	1	...	1	...	...	...
Bronchitis ... ..	...	...	...	...	1	1
Broncho-Pneumonia ... ..	...	...	1	...	1	3
Emphysema ... ..	...	...	...	...	...	...
Empyema ... ..	...	...	...	...	...	...
Inflammation Lung... ..	...	...	...	...	1	...
Pleurisy	1	1	1	...	...	...
DIGESTIVE SYSTEM:—						
Abscess of Liver	1	...	...	...	...	1
Appendicitis	1	...	2	...	1	...
Cholecystitis ... ..	...	...	...	...	...	...
Cirrhosis of Liver... ..	...	...	...	...	...	...
Colitis	1	...	...	...	...	...
Constipation ... ..	...	...	1	...	1	...
Dental Caries ... ..	...	...	1	...	...	...
Dilatation Stomach	2	...	...	...	1	...
Duodenal Ulcer ... ..	...	...	...	...	2	...
Dyspepsia	1	...	1	...	...	...
Enteritis ... ..	...	...	1	...	...	...
Gastralgia ... ..	...	...	...	...	...	...
Gastritis	4	...	2	...	4	1
Gastric Cancer ... ..	...	...	...	...	...	...
Gastric Ulcer ... ..	...	...	2	...	...	...
Hepatitis (Acute) ... ..	...	...	2	...	...	...
Hernia	1	...	...	...	...	...
Intestinal Stasis ... ..	...	...	1	...	...	...
Jaundice ... ..	...	...	...	...	...	...
Pyorrhoea Alveolaris	3	...	2	...	1	...
Rectal Abscess ... ..	...	...	...	...	1	...
Ulceration Intestines	1	...	1	...	...	...
Ulceration Stomach ... ..	...	...	...	...	2	...
Ulceration Tongue ... ..	...	...	...	...	1	...

APPENDIX.

TABLE SHOWING CAUSES OF INVALIDINGS AND DEATHS—EUROPEAN
OFFICIALS—*continued.*

Disease.	1922.		1923.		1924.	
	Invalided.	Died.	Invalided.	Died.	Invalided.	Died.

URINARY SYSTEM:—						
Bright's Disease	1	...	1	...	2	...
Diverticulum Bladder	1	...	...	...	...	...
Hæmaturia ... ..	...	...	2	...	...	...
Nephritis ... ..	...	...	...	...	2	...
Renal Calculus ... ..	...	...	...	...	1	...
Renal Colic ... ..	...	...	...	...	...	...
Rupture Urethra ... ..	...	...	...	...	1	...
Other Diseases ... ..	...	...	1	...	...	...
ORGANS OF LOCOMOTION:—						
Arthritis	2	...	1	...	3	...
Necrosis	1	...	...	...	...	...
Osteo Myrlitis ... ..	...	...	...	...	1	...
Lat. Curv. Spine	1	...	...	...	...	...
Synovitis ... ..	...	...	...	...	1	...
DISEASES OF SKIN:—						
Boils	1	...	1	...	2	...
Ulcers ... ..	...	...	1	...	2	...
INJURIES:—						
General Injuries ... ..	...	...	1	1	...	...
Local Injury	2	...	2	...	8	1
Bite by Rabid dog	1	...	...	...	...	...
Drowning (Accidental) ... ..	...	...	...	4	...	...
Gun Shot Wounds ... ..	...	1	...	...	...	...
GENERATIVE SYSTEM:—						
Stricture Urethra ... ..	...	...	1	...	...	...
CONNECTIVE TISSUE:—						
Cellulitis ... ..	...	...	...	...	...	...
TUMOURS:—						
Malignant ... ..	...	1	2	...	...	...
PARASITES:—						
Coccidial	1	...	...	...	...	...
Filariasis	1	...	...	...	...	...
POISONS:—						
Chloroform... ..	...	1	...	...	...	...
Total	139	...	...	...	119	16

APPENDIX B.

REPORT OF THE TSETSE FLY INVESTIGATION, 1924.

The work of the Tsetse Fly Investigation at Sherifuri near Azare in the Northern Provinces has continued on the lines indicated in the last report. Two species of tsetse are being dealt with;—*Glossina morsitans* which above all others is the fly which inhibits domestic stock, and *G. tachinoides*, the main Sleeping Sickness carrier of Northern Nigeria. It was proposed to test the effect of excluding wild game, on the blood of which these tsetse largely subsist, from a piece of country in which the flies abound. Wire for the necessary fence has been ordered and it is hoped to construct the fence during the coming dry season. Secondly the earlier work of the investigation indicated the possibility that long grass hampered the flies in their search for food and in order to test this the effect of late grass burning, as opposed to the early burning which is now the common custom, is to be studied. As a possible means of destroying the vicious growth of bush in which the bush-haunting tsetse shelter experiments in late grass burning have already been recommended for East Africa.

In order that these tests might be carried out on proper experimental lines an intensive study of the flies in the area concerned is being made and at the end of the present year will have been continuous for two years. The record comprises;—(a) the seasonal movements of the flies, (b) their rates of breeding; the seasonal variations, at the different foci in the area, (c) the highly significant sex proportions, (d) their infections with trypanosomes, (e) the source and amount of blood obtained, and more recently also (f) their nourishment as indicated by their fat or lean condition. In all important points the record of the second year confirms the figures obtained during the first year and these latter have been published in a detailed technical report. It is not proposed to bring forward a further technical report until the above experiments have been inaugurated. This two years record of the normal state of the flies will form one control in adjudging the effect of changing the conditions, while an additional control will be obtained by a contrasting study of the flies in that part of the area where conditions will not be changed; that is, where the game will be undisturbed and the grass burnt early.

In the accumulation of the mass of statistics more than 60,000 dissections followed by microscope examinations have been carried out. Although the final results are of considerable interest it must be confessed that such a long piece of statistical work has often been exceedingly tedious and much credit is due to the various Medical Officers who have been attached to the Investigation that, though unaccustomed to research work of this type, they have carried it through with uniform cheerfulness.

An attempt is being made to introduce into Nigeria a small Chalcid, *Syntomosphyrum glossinæ*, which parasitises and so destroys a large number of tsetse pupæ in East Africa. A stock of these was sent to England by Dr. W. A. Lamborn of the Nyasaland Medical Service. They were bred and multiplied at the Rothamsted Experimental Station under the auspices of the Imperial Bureau of Entomology and a number of consignments have been sent to Nigeria. After repeated failure owing to the length of the journey and the extreme heat a small stock at last established themselves at Sherifuri and are now thriving and multiplying in the Laboratory there. An effort to establish them in the building grounds of the tsetse will shortly be made.

Dr. W. B. Johnson, after two and a half years strenuous service with the Investigation, left the work in February. His wide knowledge of the country as well as his judgment and energy have been invaluable and it is deeply regretted that he has returned to his substantive duty. It is hoped however that he may be still available in a consultant capacity in the course of the experiments to the foundation of which he so largely contributed. Dr. H. Morrison, who replaced Dr. W. A. Young on the latter's promotion to an appointment on the Gold Coast, himself left the Investigation in April to go to Yaba Institute and Dr. J. W. B. Hanington took his place.

(Sgd.) L. LLOYD,

Tsetse Investigator.

August 7, 1924.

III. SANITATION, 1924.

(A).—GENERAL REVIEW OF WORK DONE, LAWS PASSED AND PROGRESS MADE.

(I).—ADMINISTRATIVE.

The European personnel of the Sanitary Staff consisted of the following members:—

- 1 Deputy Director of Sanitary Service — Dr. M. Cameron Blair.
- 1 Assistant Director of Sanitary Service — Dr. H. Andrew Foy.
- 3 Senior Sanitary Officers: (Dr. W. S. Clark, Dr. R. W. Orpen, Dr. W. Allan. (Arrived Nigeria, 16th May, 1924).
- 2 Medical Officers of Health: (Dr. A. Crawford. Appointed 3rd September, 1924. Dr. G. B. Walker. (Appointed, 1st October, 1924).

Subordinate Sanitary Staff: 8 European Sanitary Inspectors with one vacancy still to be filled.

RETIREMENTS, PROMOTIONS AND CHANGES IN STAFF:

Dr. M. Cameron Blair, the Deputy Director of Sanitary Service, who had filled this position since the first January, 1921, retired very early in the year on the 19th January, 1924.

Dr. Cameron Blair having joined the West African Medical Service in 1901 was most senior in the Service. He served on the Medical side for nine years and subsequently on the Sanitary side for a period of fourteen years: during this latter period, as Senior Sanitary Officer, he laid the foundations of the Sanitary work in the Northern Provinces and built up the superstructure until the war supervened in 1914 which with its retarding influences on all advancements affected the Sanitary more than others since Sanitation was so much in its infancy at the time. Shortage of Staff, with the needs of the Medical branch to be met first, and the necessity of having to exercise the strictest financial economy for four to five years after the close of the War in November, 1918, were the main causes of the set back of Sanitation, so that improvement schemes had to be held in abeyance and revival has proved slow during the succeeding two years.

Dr. Cameron Blair's retirement from the Service is much regretted.

On his retirement he has settled down to live at Zungeru in the Northern Provinces, and on the 5th June, 1924, he was appointed Honorary Consultant to the Nigerian Medical Staff by the Government and gazetted as such.

Dr. H. Andrew Foy, Assistant Director of Sanitary Service, was promoted to Deputy Director on the 19th January, 1924, on the retirement of Dr. Cameron Blair.

Dr. W. S. Clark, at this time Senior Sanitary Officer, was on the same date promoted Assistant Director of Sanitary Service. He was on duty in Nigeria throughout the year.

Dr. W. Allan, Medical Officer of Health, Sierra Leone, although appointed as Senior Sanitary Officer to the Nigerian Staff on 21st April, 1923, did not come to Nigeria until 16th May, 1924.

Dr. Dowse was promoted from Medical Officer of Health on the Gold Coast to Senior Sanitary Officer, on the 19th January, 1924, and was to assume duty as such in Nigeria in March, 1925.

Dr. Foy proceeded on leave on the 14th March, 1924, and returned to duty on 16th October, 1924. During this period Dr. Clark acted as Deputy Director.

Dr. Orpen, Senior Sanitary Officer, was on leave from July 18th to the end of the year. For three months January to March, his services were seconded as Medical Officer of Health to the Lagos Town Council.

The services of Dr. Moiser from the Medical side which have been at the disposal of the Sanitary Branch since July, 1923, were continued as Senior Sanitary Officer in the Northern Provinces from January to 15th May. Were it not for this assistance from the Medical side the Northern Provinces would have suffered very considerably.

It is thus seen that with the retirement of Dr. Blair and the absence on leave of both Dr. Foy, now Deputy Director of Sanitary Service and of Dr. Orpen, Senior Sanitary Officer, the administrative work fell to three officers for the major part of the year and during a period of three months it devolved on two officers only: the Acting Deputy Director of Sanitary Service in the Southern Provinces and the Senior Sanitary Officer in the Northern Provinces.

Medical Officers of Health.—This is the first year in which Medical Officers of Health have been appointed specifically for this duty. Lagos has always had a Medical Officer of Health but a Senior Sanitary Officer has always been seconded from the Administrative branch for this purpose. This now releases a Senior Sanitary Officer to better advantage.

Dr. Adcock lent from the Medical, relieved Dr. Orpen, Senior Sanitary Officer and acted as Medical Officer of Health from 1st April to 31st October.

Dr. Crawford was appointed Medical Officer of Health on the 3rd September, 1924, and assumed duty in Lagos as Medical Officer of Health to the Town Council on 1st November, 1924, taking the place of Dr. Adcock.

Dr. Walker was appointed Medical Officer of Health on 1st October, 1924. He was assigned the duties of Port Health Officer in Lagos.

European Sanitary Inspectors.—In 1924 there were eight European Sanitary Inspectors actually employed on the Staff, as compared to six in 1923, and one vacancy still remains. These are employed at various places in Nigeria: only one being available for Lagos.

The outbreak of Plague in Lagos very soon brought out the need there was for the services of European Sanitary Inspectors. Since the existing staff was barely sufficient for the needs of the country, the services of six Non-Commissioned Officers were obtained from the Royal Army Medical Corps, and these men arrived on the 7th November, 1924, since when their services have been found indispensable.

African Staff.—There were no changes in the ranks of the clerical staff.

In the Staff of African Sanitary Inspectors, one was promoted from Second-class to First-class. Ten Sanitary Inspectors-in-Training qualified and were promoted Third-class Sanitary Inspectors.

In the Northern Provinces, three Ungraded Sanitary Inspectors were promoted into the Third-class.

The total strength of African Sanitary Inspectors is eighty-three: of these seventy are in the Southern and thirteen in the Northern Provinces.

There was one resignation and one dismissal. Of the thirteen in the Northern Provinces, five are trained Sanitary Inspectors appointed to various Townships and the remaining eight are Sanitary Inspectors-in-Training: three for Government service Townships and five for service under Native Administrations.

Tours of Inspection.—Year after year it is reiterated in the Annual Sanitary Report that increased touring by Sanitary Officers is called for and is an essential for making sanitation effective.

Extensive touring was accomplished by the Senior Sanitary Officer in the Northern Provinces. The main causes that necessitated such touring were outbreaks of Cerebro-spinal Fever and Relapsing Fever which assumed widespread epidemic prevalence.

Outbreaks of Cerebro-spinal Meningitis amongst the labourers on the Eastern Railway Construction called for a visit of investigation on three different occasions: in February, in March and again in December. For the same reason Bauchi Province was visited in January.

The prevalence of Relapsing Fever called for investigation from Kaduna to Katsina, Daura and Kaguri.

Katsina was inspected for the selection of a site for the School; the Bako River to ascertain the extent of pollution by tailings. Sokoto in the extreme North-West and Makurdi on the Benue River to the South were both inspected with a view to advising on the layout of the Stations.

General tours of inspection were undertaken and visits made to Zaria, Kano, Minna, Zungeru, Ilorin and Offa. Special tours of investigation were undertaken: one to Karina in the Ilorin Province owing to the death of an officer from Yellow Fever on his return from local leave in that area; a second to Ondo Province to investigate some deaths that had occurred at a place called Aiyede.

In the Southern Provinces on the other hand, touring has been very limited. Ibadan, Oshogbo, Epe, Ejinrin and Ijebu Ode were inspected. Later Abeokuta was visited. The invasion of Lagos by Plague in July limited the touring in the Southern Provinces by necessitating concentration of all available sanitary efforts on combating the disease as well as on measures for preventing spread of the infection out of Lagos by land and sea.

The need for investigation of outbreaks of infectious diseases and the carrying out of regular systematic tours of inspection in the Southern Provinces West of the Niger make it necessary to have a Senior Sanitary Officer with headquarters at Lagos. When not so employed he would assist in the office and more so during those periods in the year when the Deputy Director of Sanitary Service or the Assistant Director of Sanitary Service are left single handed, during leave periods of one or the other, to cope with the enormous volume of paper work that now pours into the Sanitary Office. The growth of paper work added to by epidemic prevalence has been out of all proportion to staff and this has been to the detriment of practical inspection outside of Lagos. During 1924, a Senior Sanitary Officer has not been available in Lagos and the Assistant Director of Sanitary Service had quite three months in which he was absolutely single handed in the office and that at a time when the stress due to Plague was at its extreme. The Staff in the Sanitary Office should be such as to permit of the Deputy Director of Sanitary Service or Assistant Director of Sanitary Service proceeding on tour of inspection at any time when the two are in Lagos at the same period; to permit of this the presence of a Senior Sanitary Officer is very much needed. So also there is great need for a Senior Sanitary Officer with headquarters at Port Harcourt, or better still at Aba which is more central, so that

that part of the Southern Provinces east of the Niger including the Eastern Railway may be toured once a year at least and epidemics investigated with the application of preventive measures.

As matters stand at present with the existing Staff systematic touring and inspection of all Townships and stations at least once a year cannot be covered. The problem of inspecting Native towns and advancing systematic sanitation within Native Administrations is a vast one and so far as 1924 is concerned, efforts on touring have had to be directed mainly to the investigation of epidemic diseases and to measures for prevention.

TOWN PLANNING.

The original Central Town Planning Committee which last sat in Lagos in October, 1923, was not suitable for serving the whole of Nigeria and for two main reasons the machinery was inefficient in working:

- (a) It entailed much delay in having to refer everything to Lagos.
- (b) Local interests, best understood by those knowing the places well, were not adequately represented.

These disabilities have now been corrected by the establishment of Town Planning Committees, for the Northern at Kaduna and Southern Provinces at Lagos respectively, which have power to co-opt a Senior Railway Officer in all cases in which the Railway is affected.

These two Committees are constituted as follows:

NORTHERN PROVINCES.

Secretary, Northern Provinces (Chairman).
 Assistant Director of Medical Service.
 Senior Sanitary Officer.
 Assistant Surveyor-General.
 Assistant Director of Public Works, and
 A Secretary.

SOUTHERN PROVINCES.

Secretary, Southern Provinces (Chairman).
 Deputy Director of Medical and Sanitary Service.
 Deputy Director of Sanitary Service.
 Deputy Surveyor-General.
 Deputy Director of Public Works, and
 A Secretary.

In addition to this, Local Town Planning Committees have been formed at outstations: they are fully representative and the Medical Officer is a member.

By means of this machinery, local interests are adequately represented by the Local Town Planning Committee and receive due consideration by the Town Planning Committees of the Northern and Southern Provinces.

The machinery in itself is complete provided efficiency is maintained in its working and everybody assists towards this end. Should a Local Town Planning Committee decide in favour of any matter such as a site for a particular purpose or in favour of any particular mode of development of a Township, involving a change in policy, when there is already an approved plan, the routine procedure needs nevertheless to be followed in submitting such proposals to the respective committees before any change of policy is approved.

PLANS PASSED.

The layout of Makurdi was considered and the plan of the station as a "C" Class Township was recommended. The topographical and natural conditions at Makurdi were such as to prevent the layout being made on the lines of a "B" Class, and it has not been possible to provide a "European Residential Area" as distinct from the "European Business cum Residential Area".

At Aba an extension of the Section of the European Residential part of the township was approved. Many minor plans of housing received consideration and approval.

REGULATION OF BUILDINGS.

Within the townships this is now rendered possible.

Lagos as the only 1st Class Township has its own Building Bye-laws which are systematically enforced but, as they do not afford the sanitary advantages which might be expected of them, an early amendment of these bye-laws is in view.

In second and third class townships much good will now accrue as a result of recent legislation enacted to limit the percentage of a plot that can be built over. This will prevent congestion of buildings and ensure ample air space. In addition to this, plans of new buildings are submitted to the Medical Officer of Health before they are passed. In the larger and more important centres where developments are taking place, this is very necessary.

GENERAL HEALTH.

The general health of the Colony and Protectorate has not been good owing to the widespread prevalence of epidemic diseases which form the most outstanding features of the Medical and Sanitary history of 1924.

Amongst Europeans the general health has been fairly good and much the same as that in 1923. This information is based mainly on records of health statistics of officials only as no such definite statistics are available for non-official residents. The number of Europeans treated in Government Hospitals and dispensaries is very slightly lower than the figure for 1923, but the number of deaths shows an increase from twenty-one in 1923 to thirty-three in 1924. Judging from the records of years previous to 1923 it would appear that this number of deaths for 1923 is exceptionally low and the figure for 1924 approximates to that of other years. The death rate in European officials works out at 10.21 per thousand of average number resident. Although plague prevailed in Lagos, no case occurred in Europeans and although Cerebro-spinal Fever and Relapsing Fever were widespread throughout the Northern Provinces, only one case of Relapsing in an European is recorded.

As regards Smallpox, two cases with one death are recorded in Europeans.

Habits of life with cleanliness of person, better hygienic conditions and segregation are important factors that keep the European populations free from such infections.

INVALIDINGS AMONGST OFFICIALS.

The Official European population under the old leave Regulations is approximately half that of the number serving under the New Leave Regulations and the respective Invaliding Rates are 45.24 per 1000 in the former and 70.74 per 1000 in the latter.

The invaliding rate is highest after twelve months residential service. It should be borne in mind that amongst those serving under the twelve months tour there is a very much larger proportion of elderly officers than amongst those serving under the eighteen months tour.

IN AFRICANS.

In the Southern Provinces, Plague made its advent for the first time at the end of July and continued until December. Smallpox appeared in the form of small outbreaks near Calabar, in the Cameroons at Mamfe, at Abeokuta and a few other places.

In the Northern Provinces both Cerebro-spinal Fever and Relapsing Fever prevailed in most parts of the country causing a very great mortality, the true extent of which cannot be stated even approximately. Cerebro-spinal Fever prevailed mainly from January to April and Relapsing Fever from September to December. Outbreaks of Smallpox limited in extent took place at various places such as Maiduguri, Sokoto, Jos and Kontagora during January to April.

Legislation.—The following Legislation was passed.

REGULATIONS.

No. 13 of 1924 under Section 4 of the Quarantine Ordinance (Chapter 54) known as the Quarantine (Plague) Regulations, 1924: to provide for the inspection and disinfection of all baggage, goods and merchandise arriving or discharged from any country where plague is suspected to exist.

No. 27 of 1924 under Section 3 (1) of the Quarantine Ordinance (Chapter 54) repealing Regulation No. 10 of the Regulations No. 26 of 1917, and substituting 10 (1) and (2) defining what persons may approach within 100 yards of any ship that has not received pratique.

BYE-LAWS.

Bye-law under Section 5 of the Markets Ordinance (Chapter 58) restricting the sale of meat in the Township Market of Minna to that of animals slaughtered at the Public Slaughter House.

Bye-law under Section 5 of the Markets Ordinance (Chapter 58) governing the erection of temporary stalls or shelters in the market at Sapele.

Bye-laws made under Section 29 of the Townships Ordinance (Chapter 57) known as the Regulation of Offensive Trades Bye-laws 1924. These comprise "Permission for Offensive Trades and Penalties."

RULES.

Rule No. 2 made under the Townships Ordinance (Chapter 57) prohibiting the hawking or display of goods for sale in the streets of the Township of Lokoja.

Rules No. 3 of 1924 made under Section 41 and 43 of the Townships Ordinance (Chapter 57) applicable to seven 2nd and to three 3rd Class Townships.

From the sanitary point of view the importance of these rules, which regulate buildings by limiting the site area to be built over and providing for the necessary air space, is so great that it warrants the text of the rules to be quoted in full.

This runs as follows:

"2. In the erection of any new building the following conditions shall be observed:—

- “(a) In the Southern Provinces not more than half the area and
“in the Northern Provinces not more than one-third part of
“the area of any plot shall be covered with buildings.”
- “(b) A clear space shall be left along any boundary of a plot
“contiguous with another plot; such space shall not be less
“than five feet in width in the case of buildings not exceeding
“twenty-five feet in height and ten feet in the case of build-
“ings exceeding twenty-five feet in height. Provided that
“where any person holds two or more contiguous plots such
“plots shall for the purpose of these rules be deemed to be
“one plot.”
- “3. Any person who, in erecting any new building, fails to
“comply with the above mentioned conditions shall be liable
“to a fine of five pounds and the Local Authority may cause
“any new building which does not comply with the said
“conditions to be pulled down, and may recover the expense
“as a debt from the owners.”

This is the first step of advance towards regulating over building on plots but since it applies to a few townships it is but a drop in the ocean of Nigeria for all the vast towns under Native Administrations need similar regulating to prevent overcrowding of buildings.

PROGRESS MADE IN 1924.

Nothing can be said of any great outstanding sanitary schemes having been promoted and carried into effect.

However routine sanitation has been maintained in townships and minor sanitary improvements have been carried out. Sanitary clearings, anti-mosquito measures and efficient conservancy assist greatly in maintaining the health in stations.

The only scheme that promises to mature is that of the Enugu Water supply: this has advanced considerably and hopes are entertained of Enugu enjoying the benefits of a good Water Supply in 1925. All other Water Supply Schemes, *e. g.* that for Port Harcourt, for Ijebu Ode, for Ibadan and for Zaria are in abeyance owing to the want of necessary engineering staff. Towards the end of the year the scheme for the Water Supply of Kano from the source fifty miles distant from Kano was receiving consideration.

The legislation enacted to ensure the prevention of over building on plots and the establishment of an efficient Town Planning Organization will both help towards sanitary progress in the future.

Available sanitary energy has been expended in efforts to combat infectious diseases prevalent over a vast area; such sanitary energy was limited to the activities of three Sanitary Officers—two being tied to Lagos for the greatest part of the year—and the need for mobile Medical Officers of Health is quite apparent to those who really appreciate the extent of the needs and how such needs are best to be met.

ESTIMATES.

The Sanitary Estimates for the financial year 1923–24 provided for an expenditure of £57,411, a decrease of over £2,000 than that provided for 1922–23, and now the provision made for 1924–25, which covers in the main the year under report, amounts to £54,613, with a further decrease of £2,798.

(II) PREVENTIVE MEASURES.

(I) MOSQUITO AND INSECT-BORNE DISEASES.

Malaria.—This disease still continues to provide a very high proportion of the cases treated by Medical Officers.

In Europeans.—1,110 cases were treated and two deaths occurred.

In Africans.—18,937 cases were treated and forty-seven deaths occurred.

At all stations Sanitary gangs of labour are maintained to carry out routine Anti-Mosquito measures such as clearing of bush and grass, draining and filling in of borrow-pits, oiling of pools, etc. Kerosine oil is supplied where necessary.

Mosquito-proofing of houses.—In connection with this the situation mentioned in the report for 1923 still maintains in that the provision of mosquito proof accommodation has gradually diminished. Enquiries are being made as to the extent to which it remains with a view to reviving this important measure that not only provides for protection but for comfort also.

Quinine Prophylaxis.—So much has been written on this subject that little is left to be said in favour of the taking of quinine regularly in Nigeria where the Aestivo-autumnal type of Malaria predominates to the extent of over 90% of all forms treated.

The practical experience of those who have lived in Nigeria for several years and kept good health by the aid of Grains V of quinine daily as a prophylactic together with the systematic use of a mosquito net at night is sufficient evidence of the utility of carrying out such personal prophylaxis. All new comers will be well advised to be guided by the experience of others and not attempt to buy their own and pay dearly for it.

Blackwater Fever.—In Europeans twenty-four cases were treated with twelve deaths; in Africans seven cases were treated with no deaths.

Trypanosomiasis.—No cases are recorded in Europeans but thirty-nine cases were treated in Africans and eight deaths are recorded. The Province of Nassarawa forms an endemic centre of this disease and infection in human beings was well known as far back as 1912 when the danger of the Tsetse fly in the vicinity of Jemaa was recognised.

The collecting of labour for mining work and railway construction in this district form a source of danger in spread of infection likely to result in places remote from this centre but where Tsetse Fly already exist.

Yellow Fever.—Three deaths from this disease are recorded as isolated cases; two of these were reported in Europeans.

From the Gold Coast.—The incidence of Yellow Fever was reported five times during 1924. Cases occurred at Weshiang ten miles from Accra, Nsawam and Koforidua.

(2) OTHER GENERAL DISEASES.

(a) EPIDEMIC DISEASES.

The year 1924 has been marked by the prevalence of the following epidemic diseases:

IN THE COLONY AND SOUTHERN PROVINCES.

- (1) Smallpox, mainly during the first quarter of the year.
- (2) Plague in Lagos from July to December.

IN THE NORTHERN PROVINCES.

- (1) Smallpox
 - (2) Cerebro-spinal Fever
 - (3) Relapsing Fever—mainly during the months of September to December.
- } mainly during the months of January
} to April.

Smallpox.—The Southern Provinces have on the whole been free from any extensive outbreaks of this disease; a few localized outbreaks were dealt with in the first quarter of the year at Kumba in the Cameroons, at Odiaba near Calabar, at Buea, at Abeokuta, and there were a few isolated cases in Lagos probably imported and no quarantine had to be imposed. Towards the end of the year in December, an outbreak started at Oshogbo in the Oyo Province; this formed the preliminary of an extensive outbreak that worked through the whole of Oyo Province later on.

In the Northern Provinces Smallpox was very much more general in the first six months of the year and outbreaks, limited in extent, were recorded at the following places:—Kontagora, Jega, Sokoto, Maiduguri in Bornu, Kano, Jos on the plateau and at Ibi on the Benue River in Muri Province.

In June a more extensive outbreak was reported from Lokoja and similarly a severe one in November at Deri in the Province of Kontagora.

Vaccination.—More organized systematic vaccination has been initiated within townships by visiting house to house and street by street so as to vaccinate as many as possible of each household and more especially the young.

Lanolinated Lymph amounting to 23,400 tubes at a cost of £4,617 10s. is imported into Nigeria from England out of funds provided under the Sanitary vote. In addition to this the Native Administrations, mainly that of Oyo Province, provide for about 6,600 tubes at a cost of £887. The total expenditure on imported lymph amounts to £5,504 10s.

This expenditure on Vaccine Lymph is a contrast to the sum of £2,750 that was spent on lymph for Nigeria in 1918.

The transport of vaccine lymph wrapped in moist cotton wool and placed in wire bacteriological test tube baskets as described in the last annual report, is maintained to advantage.

The following are the recorded results of vaccinations carried out:—

VACCINATIONS.

Southern Provinces.

	1922.	1923.	1924.
Total number vaccinated ...	218,097	225,021	237,133
Number inspected for Results ...	...	..	185,146
Number successful ...	106,474	115,840	131,162
Percentage successful ...	48%	51·4%	70%

Northern Provinces.

	1922.	1923.	1924.
Total number vaccinated ...	15,278	20,334	34,617
Number inspected for Results ...	...	...	26,177
Percentage successful ...	31·9%	52·8%	67%

From the foregoing record of success in results, it is seen that considerable advance has been achieved over the results recorded for 1923. During transport of lymph, keeping the lymph as cool as possible so as to preserve its activity is very important as regards results but the other necessary precautions to be observed in the use of lymph cannot be overlooked as factors which materially influence the success rate.

PLAGUE IN NIGERIA.

OUTBREAK IN LAGOS 1924.

For the first time on record an outbreak of plague has taken place in Nigeria. Since 1908 it has occurred from time to time in the neighbouring Colony of the Gold Coast which is only one day by steamer from Lagos. An outbreak took place at Sekondi and Coomassie in March, 1924, and infection appears to have been introduced into Lagos in the month of June.

Early in July an unusual number of deaths was reported from one part of the town and it was soon discovered that the cause was bubonic plague. The blocks containing the huts in which the cases occurred and other adjacent blocks were surrounded by a fence of corrugated iron sheets sunk into the ground and radical rat destruction and cleansing of all huts and houses in this area was carried out. Five per cent. of the rats caught were found to be plague infected. After this there was a lull of three or four weeks, then cases of bubonic plague began to occur all round the initial area. The course of the outbreak was then fairly rapid, infected rodents were found in an ever increasing radius, human cases sometimes being first found but at other times infected rats were discovered days or a week or so before human cases were reported.

The progress of the epidemic is shown as regards the human cases as follows :—

For week ending.	Cases.	Deaths	For week ending.	Cases.	Deaths.
July 28, 1924	1	1	Nov. 6, 1924	36	28
Aug. 28, "	6	6	" 13, "	16	13
Sept. 4, "	6	5	" 20, "	24	14
" 11, "	15	13	" 27, "	9	7
" 18, "	26	24	Dec. 4, "	11	9
" 25, "	36	29	" 11, "	3	2
Oct. 2, "	44	39	" 18, "	4	5
" 9, "	46	40	" 25, "	2	1
" 16, "	47	31			
" 23, "	38	35			
" 30, "	44	41			

A notable feature of the disease was that although infected rats were caught in all quarters of the town, no human cases occurred in the southern and slightly better class area. The disease heavily affected the Mohammedan section of the community and the people of this section generally speaking occupy the most insanitary and overcrowded areas.

The type of the disease was bubonic and the early cases appeared to be rapidly fatal septicæmic cases with barely detectable buboes or buboes found only on postmortem examination. A few cases of pneumonic plague were reported by the pathologist but whether all or any of these were primary pneumonic plague cannot be said with certainty, but epidemiologically they were not. Later (early 1925) a few cases of primary pneumonic plague did occur.

Lagos Township includes Lagos and Iddo Islands, wharves and dockyard on the mainland at one point to the south-west and the large suburb of Ebute Metta on the mainland to the north. Plague broke out in Lagos town on the island, and after a few months infected rats were found on Iddo Island which is connected with Lagos by a bridge about 700 yards long. The importance of this was that the terminus of the Nigerian Western Railway is on Iddo Island. Iddo Island is in its turn connected with the mainland at Ebute Metta by a second bridge about 350 yards in length and up to the time of writing (more than a year after the beginning of the outbreak) no infected rats have been found in

Ebute Metta although many thousands have been examined. Plague has however, appeared at a small town about twelve miles up the Railway in spite of precautions taken to prevent rats travelling on trains from Iddo.

It is possible however, that infected rats or fleas may have got out of Lagos by means of the Motor traffic between Lagos and the town mentioned in spite of the measures taken at the inspection barrier at the bridge.

The measures taken to control the disease were mainly :—

- (1) The usual measures under the Quarantine Ordinance with regard to sea-going vessels. Rules for loading ships to prevent exportation of rats, detention of deck and third class passengers in quarantine for five days before departure and inoculation of all passengers with anti-plague vaccine.
- (2) Control of all canoe traffic. All canoes were collected at three different points on the shores and a police guard placed over them. Canoes were allowed to leave from these places only and after examination to prevent rats and fleas or sick persons being taken. Petroleum emulsion was largely used for spraying bedding, clothing, sleeping mats, sacking, etc. Inoculation of passengers was also done.
- (3) Barriers were erected at Iddo Railway station and at the bridge leading from Iddo Island to the mainland and all passengers and baggage likely to harbour rats or fleas examined and sprayed if necessary. The volume of traffic through the bridge barrier was very great and examination had to be rapidly done. A count by the Police revealed an average of over 120 motor cars and motor waggons per hour for 12 hours. Foot passengers averaged nearly 1,000 per hour during three counts at different times. The barrier was closed at dark and opened at daylight.
- (4) Rat destruction. This was carried on by traps and poison baits (Barium carbonate and Phosphorus poisons being used). Rat stations were established at three points in the town and large numbers of rats and mice were also bought from the general public.
- (5) Rat Examination. A special plague rat examination laboratory was established in the town and up to the end of 1924 over 12,000 rodents had been examined and 186 found to be plague infected. The predominant rat is *Rattus rattus* over 90% of all rats. Of the 186 infected rats found 128 were *Rattus rattus*, 26 *R. norvegicus*, 30 *Mus musculus* and 2 were shrews. A point of interest is that it was impossible to distinguish plague infected from healthy rats by naked eye examination and there was no evidence of increased mortality amongst rats at any time.

The Director of the Medical Research Institute reports the predominant rat fleas to be *xenopsylla cheopis* and *x. braziliensis*, and that *cheopis* is slightly more numerous than *braziliensis*.

- (6) Anti-plague Inoculation. Up to the end of the year about 90,000 inoculations were carried out and on the whole the people were very willing to submit to this.
- (7) An organization was quickly developed for house to house inspection for sick and their removal to the Isolation Hospital and for the removal, examination and burial of those found to have died of plague. Contacts were also generally isolated at first.

- (8) Disinfection and cleansing of huts and houses where plague had occurred. The disinfection was by thoroughly spraying with petroleum emulsion.
- (9) Evacuation. In two instances evacuation of areas heavily infected, was carried out, 179 persons in one case and about 400 in the other. The areas were thoroughly de-ratted and huts sprayed with petroleum emulsion. These areas have since remained comparatively free from plague.
- (10) Anti-plague Propaganda. This was carried out by:—Public Notices in Newspapers, Bills posted, Public Lectures, Lantern Lectures, Simple explanations to the people in their houses and compounds and by Circulars to Government Departments, Trading and Shipping Companies, Churches, Mosques and Schools.
- (11) Improvement of Dwellings. Lagos is grossly overcrowded and thousands of insanitary dwellings exist, the majority of which can only be dealt with effectively by demolition. An Area (Yaba) beyond the suburb of Ebute Metta is being laid out and houses built to accommodate those displaced when improvement of housing in Lagos begins.
- (12) Town Planning. This is dealt with elsewhere in this report.

DECLINE OF THE EPIDEMIC.

Early in November the epidemic showed a tendency to decline and the number of cases notified fell from forty-four in the last week in October to thirty-six in the first week of November and sixteen in the second week and three in the last two weeks of December.

It is difficult to express an opinion as to the cause of this decline, several factors are probably involved (*viz*) anti-plague inoculations, rat destruction, general cleansing, rise in mean temperature, etc. By the end of October nearly 50,000 inoculations had been performed and this may have caused a slowing of the incidence in human cases. There was however also a decline in the percentage of infected rats found, so that a decline in the rat epidemic may have been followed by a decline in human cases.

Lagos being the most important port and the main centre of import and export trade for Nigeria, the advent of plague, although it has occasioned a comparatively small number of deaths amounting to 344 in a population of 105,763 has demanded extensive preventive measures at very great expense out of all proportion to its ravages as compared to those due to the prevalence of Cerebro-spinal Fever and Relapsing Fever, which have been widespread throughout the Northern Provinces causing a very heavy mortality that cannot be stated in figures even approximately but is estimated to run into deaths amounting to hundreds of thousands.

CEREBRO-SPINAL FEVER.

This disease first broke out in epidemic form in the north western region of the Northern Provinces at the end of 1920 and early in 1921. At that time it prevailed in Birnin Kebbi in which district it spread subsequently but was still confined to the western part of Sokoto Province and to the Northern extension of the Province of Kontagora.

With the advent of the Wet Season in May the disease subsided. Early in 1922 the disease again recrudesced in the north-eastern border of the Province of Kontagora; it subsided in June and through the rains when it again appeared about October in French Territory north of Katsina. The foregoing is briefly the history of prevalence of this disease up to the end of 1922.

In the months of February, March and April 1923, it broke out afresh in the afore-mentioned areas; subsiding during the rains as usual it again became active in October, November and December of the same year, spreading far and wide beyond all previous limits.

By January, 1924, it had spread from the Province of Sokoto east-ward throughout the Province of Kano; the Katsina Emirate suffered very severely and 1,000 deaths are recorded as having occurred in Katsina and the district around. Further east-ward the disease spread through the Province of Bornu. At the same time its spread took place in a southerly direction: on the east towards the southern boundary of the Nupe Province threatening an advance further south into Ilorin; on the west the disease spread south-ward into the Yola Province and Muri Province with cases reported from Ibi south of the River Benue and its advance now threatened the northern borders of the Southern Provinces.

Down the centre of the Northern Provinces the disease invaded Zaria Province, Bauchi Province and Nassarawa Province. The end of the year still saw cases occurring amongst labourers employed on the Eastern Railway Construction.

All possible measures were taken to check spread of the disease by activities of Sanitary and Medical Officers. In townships such action proved most effective. Further afield advice had to be given through Political Officers and Native Administrations. The disease being associated with the dry harmattan season accompanied by a strong North-east wind, much dust and often severe cold necessitated measures such as the allaying of dust by damping of floors in markets, in public places and houses, so also that of railway platforms and of carriages; providing for free ventilation and the prevention of overcrowding. These measures were effectively carried out at the labour camps on the eastern railway construction.

Advantages in the way of treatment of the sick together with isolation were afforded wherever possible.

The disease being so widespread it is not difficult to see how great was the problem of carrying out preventive measures and treatment and how futile were the attempts to check its advance with the existing Sanitary Organisation and the machinery to direct it.

It is quite impossible to quote any figure in support of the degree to which the present epidemic prevailed and as to the number of the population wiped out in Nigeria. Some inference may however be made from the figures given by Dr. Moiser who in 1921 made very close observations on the outbreak in the Province of Sokoto and obtained statistics as near as possible from Political Officers. Dr. Moiser gave the population as 1,361,000, the number of deaths as 45,900 and a mortality rate of 33 per 1,000 population.

The case mortality in the Birnin Kebbi Division worked out at 43.5%. Accepting these figures with a certain degree of reserve some idea can be formed as to the mortality that must have resulted in the following nine Provinces affected: Nupe, Sokoto, Kano, Bornu, Yola, Muri, Bauchi, Zaria and Nassarawa.

Relapsing Fever.—In addition to the pestilence of Cerebro-spinal Fever that walked through the Northern Provinces in the first four months of 1924, Relapsing Fever manifested itself later on in July at Kaduna.

It has to be borne in mind that in the last quarter in 1923 a very definite outbreak of Relapsing Fever occurred in the Kontagora Province—now merged into the Nupe Province—and that one case also occurred at Kaduna. It is not unlikely that a further introduction of

infection took place into Kaduna from the same source, or that an insidious spread of the original infection, brought at the end of 1923, took place until it took the form of an outbreak.

The spread of infection from Kontagora Province radiated southward into the Ilorin Province and northward into the Provinces of Katsina, Sokoto, Kano and then into Bauchi and Bornu where at Maiduguri it assumed a severe outbreak. Since infection is readily transported by persons infested with infected lice, and as transport to Lagos by train from Kaduna and Kano can be accomplished in 3 days, it was not surprising that a definite series of cases occurred in Lagos in the Hausa quarter of the town in September, 1924, but sanitary activities in Lagos were prompt and effective, so that no general outbreak has occurred. Incidentally this brings out the value of effective sanitary organisation in prevention of disease.

By the month of December the disease was attaining its maximum intensity in the Provinces already mentioned.

In Kano and Katsina, where records of deaths are maintained by the Native Administrations, the mortality can be stated to have been appalling. On the plateau in Jos Township alone, eighty cases were treated by the Medical Officer in the Hospital. Later the disease spread into Nassarawa Province and a few cases had been admitted for treatment on the Eastern Railway Construction.

In these southern reaches of the Northern Provinces, *viz*: Ilorin, Nupe, Nassarawa, and Muri, the end of the year saw them invaded by Relapsing Fever but the subsequent history of its prevalence in these areas and of spread of the disease further south will be reserved for the 1925 report.

Reference has been made to the appalling mortality at Kano. It will be well to give a few authentic figures.

The population of Kano is estimated at 50,000, with an additional floating population of 20,000 during the ground-nut season; which is the Dry season November to March.

The following figures give the average monthly deaths for each of the following years:—

1918	...	...	203·75	per month	
1919	...	...	127	"	"
1920	...	...	122	"	"
1921	...	...	131·2	"	"
1922	...	...	132·6	"	"
1923	...	...	189·3	"	"
1924	...	...	529·	"	"

Average per month for
4 years = 128.

From the foregoing figures the true average monthly death rate of Kano for normal years may be safely struck from the 4 years 1919 to 1922 and it amounts to 128 per month. The high figure of 203 in 1918 was due to Influenza. In 1923 the rise to 189 per month was due to Cerebro-spinal Fever.

Now comes the excessive mortality figure of 1924 when the number of deaths monthly averaged 529.

In the first quarter of the year the two diseases Cerebro-spinal Fever and Relapsing Fever were running concurrently. The average number of deaths monthly during the six months January to June amounted to 640. During the months of February and March the mortality figures reached 1,340 and 820 respectively.

For the second half of the year 1924 July to December, the average monthly deaths amounted to 424 but now Cerebro-spinal Fever had faded away very considerably and the main cause of this high mortality was

Relapsing Fever which attained its worst in December occasioning 558 deaths. The intensity of the disease continued high with somewhere near 400 deaths per month during the first quarter of 1925 but this will form a chapter in 1925 report.

These figures will convey more if they are converted into a death rate and made comparable to the death rate of a place such as Lagos.

Lagos has a population of 105,763: in 1923, a year when the place was free from epidemics, the total deaths for the year amounted to 2,492 with a death rate per annum of 23·8 per 1,000 population. In 1924, the deaths inclusive of those due to plague amounted to 3,251 and the death rate was 26·9 per 1,000.

Kano City with a population of 50,000, half that of Lagos, in normal years had an average number of deaths at 1,536 with an average death rate of 30 per 1,000 per annum but during 1924 the total deaths came to 6,384 with an average death rate of 130 per 1,000 population per annum.

What has been said of the mortality in Kano can be said with safety of the rest of the towns and villages not only in the Kano Emirate and the Emirate of Katsina but also of Sokoto and Bornu in which Provinces the disease first inflicted such loss of human life and then later spread southward as has already been detailed earlier when describing its advance.

The mortality caused not only by Relapsing Fever but by Cerebro-spinal Fever shows the great need there is for very much more extensive machinery for the practical application of both curative and preventive medicine. In Relapsing Fever both are effective: Curative medicine is however confined to limited areas of townships. As much as possible has been done to place cure of this disease at the disposal of the indigenous natives in such areas but comparatively few have availed themselves of the benefit of cure. Prevention however needs to be the aim prior to cure and since preventive measures can be made very effective, what is wanted is education of the people both near and remote from centres of cure.

Every effort has been made to spread knowledge in the form of propaganda through Medical Officers and through Political Officers to Native Administrations and their people so as to promote preventive measures as regards personal body cleanliness, destruction of vermin such as lice and bugs in clothes by boiling and exposing them to the direct rays of the sun and in huts by burning down such infected dwellings as well as by isolation of the sick and their treatment.

Yet how futile has been the result as regards stemming the advance of this pestilence and in averting the high mortality occasioned by it.

The situation demands much greater activity and the provision of machinery that will permit of the gradual education of the people remote from townships not only in respect of preventive measures against epidemic diseases but in all matters relative to the improvement of sanitary conditions and of public health.

Such machinery to be effective must be efficient and adequate. To be efficient it needs to consist of duly qualified Medical Officers of Health whose life's work and entire interests will be devoted to sanitation and public health problems. Such men must be mobile so as to tour round, teaching—not "preaching" to—the people with a view to educating them into practical preventive measures against epidemic diseases as well as in general sanitation.

Such men would be best able to investigate efficiently outbreaks of disease causing undue mortality, put in action necessary preventive measures and treat cases.

In this way the more important work of education would precede and introduce curative medicine.

In the large centres both in Townships and native towns, there is need for well organised and equipped Infectious Diseases Hospitals, whether provided by Government or out of Native Administration funds, and this need is an urgent one in the face of prevalent epidemics. Some comfort needs to be provided to induce patients to leave their own homes for isolation.

As in the case with smallpox these three diseases Plague Relapsing Fever and Cerebro-spinal Fever have spread into or through Nigeria; endemic centres will continue to exist and seasonal variations as well as the presence of vermin such as lice, bugs, fleas and rats, will result in recrudescence with high mortality in all fresh centres of infection: hence now it is necessary to provide efficient and effective machinery for prevention in future. Such machinery must be organised, directed, supervised and controlled by experienced senior officers specialised in sanitation, for it to prove of progressive value.

Chicken Pox occurs generally throughout the country. Prisons often form the seat of definite outbreaks. It is of little importance since the mortality is practically nothing.

(b)—NON-EPIDEMIC DISEASES.

Tetanus is a fairly common affection. In Lagos there was a considerable increase in the number of deaths recorded in 1924 over the number in 1923.

Leprosy is to be met with everywhere but the main centres of prevalence are in the Northern Provinces and it is worst in the Province of Bornu. At Maiduguri 326 cases were treated in the Leper Camp maintained there.

In the Southern Provinces quite half the population of Kwale is estimated to be affected with Leprosy.

Venereal Diseases. Both Gonorrhoea and Syphilis are very prevalent throughout the country. Cases treated give no information as to degree of prevalence.

The following cases were treated at Government Hospitals:

	1922.	1923.	1924.
Syphilis	1,335	1,727	1,967
Gonorrhoea	3,167	4,399	4,102

No anti-venereal measures in general have been initiated but adequate treatment is available for those of the public who wish to avail themselves of it.

Yaws is a disease for which more people seek treatment. In all 1875 were treated.

Dysentery is generally endemic all over and claims many victims; the amoebic form is the one most prevalent. In Europeans 88 cases came under treatment with one death: in African 2,088 cases were treated with 102 deaths. No figures are available to convey any definite information as to degree of infection that exists amongst the native population.

Tuberculosis. Cases of Tuberculosis are met with at almost all stations. In all 348 cases were treated at Government Hospitals with 89 deaths.

The following tabulated statistics afford some information as to the incidence of tuberculosis in Lagos:—

TUBERCULOSIS IN LAGOS.

	1919.	1920.	1921.	1922.	1923.	1924.
Lungs	53	48	57	74	85	69
Tuberculosis other parts	10	8	8	4	6	23
Totals	63	56	65	78	91	92
Total certified deaths of Africans	823	1,002	1,060	1,196	1,081	1,844
Percentage of certified deaths	7·6	5·6	6·1	6·5	8·4	4·9

In 1923 the number of deaths certified by Medical Practitioners formed 43·3% of the total deaths registered whereas in 1924 they formed 56·7%. The true number of deaths from Tuberculosis is probably higher than the figure given since there may be an error in registration due to some uncertified deaths, which, though due to Tuberculosis, are registered as Bronchitis.

The improved building bye-laws, referred to in a previous part of this report, when put into application will help to improve insanitary conditions but the effect will be too slow and too localised if town planning of the insanitary areas is not carried out at an early date to improve the congested over-built insanitary areas of Lagos as measures against both Plague and Tuberculosis.

Influenza has occurred as mild outbreaks in many places. In Lokoja an abdominal type was recorded in 1924.

Enteric. Nine cases have been recorded as treated in Europeans but no deaths; in Africans six cases with one death are recorded.

(c) HELMINTHIC DISEASES.

There is little new to add to what is known and has been written on the prevalence of such diseases as Guinea worm, Bilharzia, Tape-worm, Ascaris and Hook-worm.

Figures of cases treated for these infections give no indication as to degree of prevalence amongst the indigenous population. The greatest danger is occasioned by the Hook-worm which is very prevalent and can be found in as many as 30 to 90% of those who do not adopt the use of "Salgas" or midden cesspits which are a common institution in each household of Hausa people in the Northern Emirates of the Northern Provinces.

Efforts have been made to introduce its adoption by the Yorubas and other races in the Southern Provinces.

Amongst prisoners infected with Ankylostomiasis, mortality runs high when other diseases such as dysentery or pneumonia supervene.

The use of the pail system with incineration of nightsoil is the most effective method of prevention of spread of infection and one that is of most value where labour is employed in large numbers on construction work, on mining or in workshops.

(III)—GENERAL MEASURES.

DRAINAGE: TEMPORARY AND PERMANENT.

Very few stations have permanent drains; in most places open earth drains are resorted to: the former are expensive to construct, the latter incur expenditure to repair and keep clear of weeds, grass and earth which obstruct. In other places natural channels serve the purpose of drainage.

In Lagos 110 linear yards of masonry drainage were constructed. Lagos has a Drainage and Road Construction programme which is to cover a period of five years in the future from 1925 to 1929 but this will not confer the full benefit that it would were the low-lying areas primarily reclaimed.

In Lagos 933 yards of earth drains were made. in Calabar 1,360 yards and in Port Harcourt 1,000 yards.

On the Eastern Railway Construction, the Medical Officer considers that generally in practice borrow pits are drained.

BUSH CLEARING AND DHUB GRASS PLANTING.

In every station wherever it is possible. sanitary labour is used not only on regular clearings but on radical clearing and subsequent planting with Dhub grass. Wherever elephant grass is abundant, this is a tedious process for grass has to be up-rooted. It is, however, gratifying to report that there is definite advancement being made in effecting permanent clearings and in Dhub grass planting.

REFUSE DISPOSAL.

Dustbins are provided so far as money will permit as depositories for refuse. Disposal is by burning, burial, into the sea or lagoon, and by dumping on lowlying areas as a means of reclamation. This last method of dumping in lowlying swampy areas is largely resorted to in Lagos and is a procedure to be strongly deprecated but it is done for want of one or more efficient Refuse Destructors on which a considerable outlay of money is needed. So far this matter has only been discussed in the Town Council but no practical decision has been arrived at.

NIGHTSOIL DISPOSAL.

This is accomplished by burial; disposal into the sea or creeks and by incineration in specially constructed nightsoil incinerators.

This last method is in practice in Lagos, Port Harcourt, Enugu. Its utility is best indicated for dealing with nightsoil of prisons, labour camps or mines and other collections of small communities, also where soil is unsuitable for trenching due to clay or rock or else transport to distant places for disposal otherwise is too expensive. Efforts are being made to extend the incineration of nightsoil.

WATER SUPPLIES.

Several schemes for new water supplies have in past years been considered, sanitary surveys have been made, during 1924 all but one were in abeyance for want of engineering staff to promote and carry the schemes through. The Enugu scheme promises to mature in 1925. The Kano water scheme from the Gangara River, as a source of supply 50 miles out from Kano, began to receive consideration at the end of 1924.

TOWN PLANNING IN LAGOS.

There are in Lagos Island several lowlying insanitary areas, much overcrowded and badly drained.

These areas which form the endemic centres of plague and the deposit of refuse only adds to the situation in fostering the abode of rats.

Towards the end of the year there was begun the New Layout at Yaba—a scheme for the building of 84 model houses with a view to accommodating at least 1,000 people of those to be evacuated from insanitary areas in Lagos Island for the purpose of town planning such areas—and the hope was entertained that completion would be effected within six months but this has not materialised.

A Special Town Planning Committee for dealing with Lagos Island and Yaba was appointed but up to the end of the year it had not met to consider what were the needs of Lagos as regards the insanitary areas to be dealt with, in what order of importance these areas should be taken in hand, and how the all important question of financial outlay was to be met or overcome since the carrying into effect of the scheme will involve very heavy expenditure carefully considered and spread out over a number of years. The scheme needs to be a concrete one, well considered by a body of local experts and when once begun it should be steadily matured. In 1920-21 two of the most lowlying insanitary areas of Lagos were dealt with by extensive reclamation, a well thought out scheme by the present Town Engineer was drawn up with a "Plan showing Proposed Town Planning Scheme Alakoro and District." As a result of this reclamation by pumping in of sand a raising of the areas to the extent of 3 to 7 feet was accomplished but the absence of a sea wall at the outlets into the Lagoon formed a serious drawback and much of the good done was lost subsequently. The scheme drawn up by the Town Engineer covered Town Planning of the District with new roads but this has never been carried out. The original scheme was estimated to cost about £90,000 inclusive of the proposed reclamation of the Bell-mouth of Elegbata with the layout of a model market on the reclaimed area. Up to date £26,000 have been spent on the partial development of this scheme: much improvement has been effected by the raising of the level, by improving the existing roads and by providing drainage but the original re-town planning part of the Scheme remains unaccomplished.

PRISONS : SOUTHERN PROVINCES.

In the Government Prisons, the daily average for 1924 amounted to 6,658 as against 7,316 in 1923, *i.e.* the average was less by 658.

The financial provision for food amounted to £76,986 in 1924-25 as against £76,463 in 1923-24 an increase of £523.

The Death Rate per 1,000 calculated on the daily average works out at 34.39 in 1924 as against 28.97 for 1923.

This general rise in the Death rate, notwithstanding less prisoners with the provision of more money for food, leads to the conclusion that the general health of the prisoners was not as good as in 1923.

In the Southern Provinces during 1923, only three prisons, *viz.* : Enugu, Okigwi and Onitsha had a death rate of over 60 per 1,000; in 1924 no less than eight prisons, *viz.* : Abeokuta, Agbor, Afikpo, Enugu, Ibadan, Ikot-Ekpene, Obubra and Okigwi have an average death rate of over sixty and the combined average death rate of these eight works out at 78.8 as seen from the Appendix formed by the Summary of Prison Sanitary Statistics.

Diet.—The question as to whether the feeding of prisoners on dried fish and preserved meat—known as "pulled beef"—is altogether wholesome, more especially when it has to be transported long distances; this matter needs close observation as regards quality and effects on health. In the case of one prison, the fish supply from Lagos was found to be bad and was destroyed after having caused several cases of diarrhoea. At another large prison, there was an outbreak of Diarrhoea and Dysentery which caused 3 deaths; it was traced to a supply of musty farina

In most of the prisons the diet is said to be to scale but quality needs to be looked to and constant supervision needs to be exercised in seeing that each prisoner gets his full share. The beneficial influence on the maintenance of health and a low death rate of good food and fresh meat daily is seen in the case of the Ogoja Prison on which the Medical Officer writes :

“ Ogoja Prison is exceedingly well fed, prisoners getting their
“ ration of fresh meat daily and all the other articles of diet
“ are kept well up to standard.”

“ The health of the prisoners has been excellent. There were no
“ deaths during the year.”

The recommendations for prisons in the Southern Provinces comprise :

1. Increased cell accommodation and in large prisons such as Enugu and Port Harcourt, permanent buildings are needed as cells. At Enugu and Port Harcourt, permanent buildings for hospital purposes are needed as a primary consideration.
2. The diet needs to be watched as regards quality especially where preserved meat and fish take the place of fresh food and have to be transported long distances. The amount of food issued to each prisoner needs close supervision.
3. The general sanitary condition as a whole of prisons in the Southern Provinces is stated to be satisfactory but permanent latrines are advocated in place of temporary ones in use and the incineration of nightsoil in properly constructed faecal incinerators at each of the larger prisons is strongly recommended.

In the Northern Provinces the Government Prisons are well reported on.

The accommodation on the whole appears to be adequate, the diet to scale, the general sanitary condition good but permanent latrine accommodation is advocated. The health of the prisoners is stated to be good and the death rate recorded is only 5.58 per 1,000 daily average.

For Lokoja separate accommodation for the insane is recommended since lunatics occupy the same yard and environments as the ordinary Convicts.

Native Administration Prisons.—Increased accommodation is recommended at Jos and Maiduguri owing to overcrowding there.

Diet is not to any laid down scale as in Government prisons.

The pail system and “ Salgas ” (deep midden latrines) are adopted for latrine purposes.

The health of the prisoners has been bad : the death rate very high at 108.9 per 1,000 daily average. The main causes of the high death rate are attributed to infectious diseases especially so in the Prisons at Kano and Maiduguri.

SANITATION IN NATIVE ADMINISTRATION AREAS.

These areas are very extensive and the sanitation of Native towns within them is directed by the respective native administrations.

A certain number of men have been trained as Sanitary Inspectors for the Administrations : in all there are seven such employed as follows : Sokoto 1, Katsina 1, Bornu 1, Zaria 2, Bauchi 1 and Bida 1. The work of each of these men lies in the principal town of each Emirate from which he was sent for training.

The training given to African Sanitary Inspectors employed in the Northern Provinces, whether in Government Townships or under Native Administrations, is of an elementary character and purely practical. They have no colloquial and written knowledge of English and hence the limited training in sanitation that has been given them in the past. Subsequent efficiency and utility of these Sanitary Inspectors depends largely on supervision exercised over them: in and near townships where a Medical Officer is quartered such supervision can be exercised to advantage. Better educated indigenous Hausas with a knowledge of English are needed so that they can be given a higher training, prove more useful and be able to exercise some initiative in their work.

In the past, Sanitary Officers on tour after inspecting a native town and noting the insanitary conditions have in the audience of the Political Officer in charge lectured to the chief, headmen of the town and community advising them of the insanitary conditions and urging reforms. Such visits of inspection cannot be even carried out annually to all parts for want of sufficient Senior Sanitary Officers, and continuity of policy as regards sanitary improvements once initiated cannot be followed up to effect.

Many new native towns under Native Administrations chiefly in the Northern Provinces have been laid out on sanitary lines, similar to those on which the Non-European section of townships under Government Administration have been laid out and as such they form a great advance on the irregular layout of existing native towns. There is however no regulation limiting the proportional area of any plot or compound to be built over by housing.

In 1918 a number of simple sanitary Rules were drawn up by the writer of this report for application to native towns under native administration in the Southern Provinces.

These rules include one bearing on the limitation of 50% area of any plot to be built over. The rules were circulated to Residents in charge of each Province. Nothing however was done to promote their application and they rapidly passed out of sight.

It has to be realised that there are 18 millions of Africans, whose future welfare as regards public health has to be considered and promoted very much more systematically, quite outside the limits of circumscribed garrison sanitation confined to townships.

What is needed is definite sanitary organisation comprising: firstly, some form of Health Board in each Native Administration to promote the application of definite sanitary Rules and be responsible for the advance of sanitation; secondly, an adequate staff of trained Sanitary Inspectors and thirdly, Medical Officers of Health who can advise the Board, initiate improvements and watch progress giving the necessary guidance. This offers a very wide field of work for Medical Officers of Health whose services would cover general sanitation as well as the investigation of outbreaks of infectious disease advising as to necessary preventive measures and treatment of the sick. Under normal conditions when touring he would render medical and surgical aid to any that are sick and seek treatment. It will be in this way that places and people remote from townships will be reached.

VITAL STATISTICS.

Registration of Births and Deaths of Europeans and Non-Natives is compulsory throughout Nigeria but in case of Natives it is only so in Lagos. Some advance is expected to be made as regards the registration of Births and Deaths of Natives in some of the townships other

than Lagos. In Lagos such registration has proved of great value more especially in time of epidemic prevalence as during the recent outbreak of plague in 1924.

A table giving a summary of vital statistics of Lagos Township is to be found as an appendix to this report.

As regards Native Administrations in the Northern Provinces, Births and Deaths are recorded in two cities viz. : Kano and Katsina.

B.—MEASURES TO SPREAD KNOWLEDGE OF HYGIENE AND SANITATION.

Hygiene and Sanitation are taught in all Government and Assisted Schools. A graduated course of instruction is drawn up suitable to the various classes.

Those qualifying as teachers have to pass an examination in these subjects so as to impart such teaching to others; the want of the practical side to such teaching renders it of little value. Such teaching of Sanitation and Hygiene is work that is really suitable to and would be done to advantage by Medical Officers of Health when on tour. Sanitary Officers on tour do what they can when touring in visiting schools and delivering lectures to the children on these subjects at the same time inspecting the children for efficient vaccination. There is great scope for advancing a knowledge of sanitation in this way and it is only to be regretted that the facilities do not exist owing to want of staff to do so more generally by visiting more schools systematically.

The Health Week Organisation promoted lectures and demonstrations as was done last year, besides these sermons were given, school children wrote essays on some public health subjects. It is regretted that a visit to the Iju Water Works which has always afforded much interests to the public could not be carried out.

The raising of a higher type of African Sanitary Inspector, who is more highly trained, could do much towards teaching the natives more of sanitation and the objects for urging them to put it into application.

MATERNITY AND CHILD WELFARE.

No advance has been made so far as regards promoting these two important matters. Hopes are entertained that 1925 will show a beginning in this respect and that some organisation will be brought into being in a big centre such as Lagos.

C.—RECOMMENDATIONS FOR FUTURE WORK.

1. An increase of Sanitary Staff in the future :

- (a) of Senior Sanitary Officers to permit of much more touring and the carrying out of inspections of all parts of the country at least once a year.
- (b) of Medical Officers of Health so as to deal more promptly and effectively with outbreaks of epidemic diseases and advance sanitation generally in the vast areas under Native Administrations remote from the circumscribed influence of curative medicine within townships.

2. Promote sanitary improvement in the Building Byelaws for Lagos Township.

3. Promote the improvement in the sanitary areas of Lagos by advancing town planning to combat Plague and Tuberculosis. The New Layout of Yaba with its 84 houses can be used to advantage for this purpose
4. There is great need for the establishment of an efficient sanitary organisation as part of the machinery of each Native Administration to promote sanitary improvements and be responsible for advance by carrying into effect definite sanitary rules drawn up for their guidance.
5. Raise a more efficient staff of African Sanitary Inspectors.
6. Increase the number of townships and the Native Administration areas for effective conduct of registration of Births and Deaths of Natives.

The following tables, etc., are attached to this Report :—

1. Table I. (Table IV. of the Model Report).
2. Table of Statistics in reference to Prisons.
3. Table showing returns of Anti-Mosquito Work and Rainfall.
4. Summary of Vital Statistics, 1924.
5. Chart shewing Deaths in Lagos each week for the Years 1921-22-23 and 24.

H. ANDREW FOY.

Deputy Director of Sanitary Service.

TABLE IV.

(1).—TOWN AREA AND OPEN SPACES.

Year.	LAGOS.		CALABAR.	
	Approximate Area in Acres.	Number of Proclaimed Open Spaces.	Approximate Area in Acres.	Number of Proclaimed Open Spaces.
1922	1,152	3	9.2 sq. miles	3
1923	1,152	3	9.2 „ „	3
1924	1,152	3	9.5 „ „	3

(2).—POPULATION.

Year.	LAGOS.			CALABAR.		
	Number of Europeans.	Number of Natives.	Total.	Number of Europeans.	Number of Natives.	Total.
1922	—	—	102,260	118	16,450	16,568
1923	—	—	104,530	152	16,499	16,651
1924	—	—	105,763	142	16,438	16,580

(3).—HOUSING.

Year.		LAGOS.				CALABAR.			
		Houses.		Huts.		Houses.		Huts.	
		Number occupied by Europeans.	Number occupied by Natives.	Number occupied by Europeans.	Number occupied by Natives.	Number occupied by Europeans.	Number occupied by Natives.	Number occupied by Europeans.	Number occupied by Natives.
1922	...	376	4,466	58	6,020	65	57	—	2,354
1923	...	477	8,814	38	6,200	65	58	—	2,405
1924	...	478	6,391	36	6,441	68	58	—	2,451

TABLE IV—*continued*.

(4).—ERECTION OF NEW BUILDINGS DURING THE YEAR.

Year.	LAGOS.		CALABAR.	
	Number of houses built without sanction.	Number of huts built without sanction.	Number of houses built without sanction.	Number of huts built without sanction.
1922	5	4	—	—
1923	3	18	—	40
1924	9	25	—	17

ACTION TAKEN.

Year.	LAGOS.		CALABAR.	
	Number of prosecutions.		Number of prosecutions.	
	Houses.	Huts.	Houses.	Huts.
1922	5	4	—	133
1923	3	18	—	40
1924	6	41	—	17

TABLE IV—continued.—(5).—LATRINES—PUBLIC.

Year.	LAGOS.										CALABAR.					
	Number of Latrines.					No. erected during the year.					Number of Latrines.			No. erected during the year.		
	Male.		Female.		Number.	Male.		Female.		Number.	Male.		Female.		Male.	
	Number.	Number of seats.	Number.	Number of seats.		Number.	Number of seats.	Number.	Number of seats.		Number.	Number of seats.	Number.	Number of seats.	Number.	Number of seats.
1922	38	253	36	223	1	1	5	1	5	19	145	18	132	126	59	36
1923	34	250	32	225	...	...	...	...	...	19	145	18	132	137	17	6
1924	34	223	32	197	1	1	5	1	5	19	145	18	132	182	51	6

LATRINES—continued. (PRIVATE).

Year.	LAGOS.								CALABAR.							
	No. of private latrines.	Average No. of pails of nightsoil removed daily.	Average No. of clean pails substituted for soiled pails.	No. of nightsoil men employed.	No. of cesspools.	No. of cesspools cleaned.	No. of new cesspools constructed during the year.	No. of old cesspools abolished.	No. of private latrines.	Average No. of pails of nightsoil removed daily.	Average No. of clean pails substituted for soiled pails.	No. of nightsoil men employed.	No. of cesspools.	No. of cesspools cleaned.	No. of new cesspools constructed during the year.	No. of old cesspools abolished.
1922	7,569	973	973	46	...	...	...	...	534	385	731	78	126	126	59	36
1923	8,309	924	924	48	...	...	...	...	480	368.38	528	81	137	137	17	6
1924	7,786	903	903	48	...	...	...	...	511	357	497	80	182	182	51	6

TABLE IV—continued.—(6).—REMOVAL OF REFUSE.

Year.	LAGOS.						CALABAR.					
	Number of dust-bins.	Number of carts removing street refuse daily.	Amount of refuse removed daily.	Number of carts removing refuse from yards and premises daily.	Amount of refuse removed from yards and premises daily.	Number of men employed for re-moving refuse.	Number of dust-bins.	Number of carts removing street refuse daily.	Amount of refuse removed daily.	Number of carts removing refuse from yards and premises daily.	Amount of refuse removed from yards and premises daily.	Number of men employed for re-moving refuse.
1922	51	2 Motor lorries 31 carts.	70 tons.	...	...	313	115	5	1614·98	...	875·63	81
1923	57	3 Motor lorries.	280 tons.	1 Motor.	1 ton 3 cwt.	300	116	5	1236	...	316,931 (10 galls. drums)	95
1924	55	5 Motor lorries 5 Canoes.	262 tons.	1 Lorry	2 tons.	355	117	5	1237 drums.	...	333 (10 gallons drums).	92

(7).—MODE OF DISPOSAL OF EXCRETA, REFUSE AND OFFAL.

Year.	LAGOS.												CALABAR.											
	Buried or Trenched.			Burnt.			Thrown into Sea.			Otherwise dealt with.			Buried or Trenched.			Burnt.			Thrown into Sea.			Otherwise dealt with.		
	Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	Daily average number of pails of excreta.	Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.	Daily average number of pails of excreta.	Daily average number of cart-loads of refuse.	Daily average number of cart-loads of offal.
1922
1923	1338	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1924	880	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE IV—*continued.*

8. Average daily number of cartloads of tin cans, bottles, broken crockery, and other incombustible materials removed from houses, huts, and compounds.

YEAR.	LAGOS.			CALABAR.			
1922			581 Public spaces and streets.			
1923			258	"	"	"
1924			0.44	"	"	"

(9).—WATER SUPPLY.

PIPE-BORNE WATER.

Year.						LAGOS.			CALABAR.		
						Source (river, lake or spring).	No. of public standpipes.	No. of private standpipes.	Source (river, lake or spring).	No. of public standpipes.	No. of private standpipes.
1922 ... ..	...	...	...	...	...	River	182	1,563	Spring	6	102
1923 ... ..	...	...	...	...	...	"	185	1,757	"	6	102
1924 ... ..	...	...	...	...	...	"	199	1,913	"	6	104

WELLS.

Year.						LAGOS.				CALABAR.			
						Public.		Private.		Public.		Private.	
						Number.	Number with pumps protected against surface water and mosquitoes.	Number.	Number with pumps protected against surface water and mosquitoes.	Number.	Number with pumps protected against surface water and mosquitoes.	Number.	Number with pumps protected against surface water and mosquitoes.
1922 ... ..	...	...	5	...	...	2,526	6	...	...	3	...	...	...
1923 ... ..	...	...	6	1	...	2,462	5	...	...	3	...	...	...
1924 ... ..	...	...	5	...	...	2,388	5	...	...	3	...	...	...

TANKS (PUBLIC).

Year.		LAGOS.			CALABAR.		
		Number mosquito protected and served by pumps.	Number above ground.	Number mosquito protected.	Number mosquito protected and served by pumps.	Number above ground.	Number mosquito protected.
1922	2	1
1923	2	1
1924	2	1

TABLE IV—(continued.)

TANKS (PRIVATE).

Year.	LAGOS.						CALABAR.					
	Number under ground.	Number mosquito protected and served by pumps.	Number above ground.	Number mosquito protected.	No. of 400 galls. capacity or less.	Number above 400 galls.	Number under ground.	Number mosquito protected and served by pumps.	Number above ground.	Number mosquito protected.	No. of 400 galls. capacity or less.	Number above 400 galls.
1922	314	302	258	56	...	...	58	50	29	29
1923	280	269	242	38	...	...	58	50	29	29
1924	294	294	257	37	...	...	62	53	32	29

NATURE OF TANKS.

Year.				LAGOS.			CALABAR.		
				Wood.	Iron.	Concrete.	Wood.	Iron.	Concrete.
1922	172	142	...	58	...
1923	221	59	...	58	...
1924	222	72	...	61	...

BARRELS.

Year.					LAGOS.		CALABAR.	
					Number.	Number mosquito protected.	Number.	Number mosquito protected.
1922 ... ..	...	...	...	...	367	172	350	1
1923 ... ..	...	...	...	...	811	66	353	1
1924 ... ..	...	...	...	...	762	137	380	1

(10).—DRAINAGE.

(MASONRY DRAINS) PUBLIC DRAINS.

Year.		LAGOS.			CALABAR		
		Linear yards.	Linear yards reconstructed during the year.	Linear yards repaired during the year.	Linear yards.	Linear yards reconstructed during the year.	Linear yards repaired during the year.
1922 ... ..	...	40,480	473	100	13,740	...	...
1923 ... ..	...	46,640	400	200	13,924	...	210
1924 ... ..	...	6,067	110	...	14,922	...	54

TABLE IV—(continued.)

PRIVATE DRAINS (MASONRY DRAINS).

Year.	LAGOS.			CALABAR.		
	Linear yards.	Linear yards reconstructed during the year.	Linear yards repaired during the year.	Linear yards.	Linear yards reconstructed during the year.	Linear yards repaired during the year.
1922	16,669	...	...
1923	16,669	...	...
1924	16,669	...	...

PUBLIC DRAINS—continued. EARTH DRAINS OR DITCHES.

Year.	LAGOS.			CALABAR.		
	Linear yards of ditches cleaned.	Linear yards of ditches dug and graded.	Average frequency of clearing ditches of grass.	Linear yards of ditches cleaned.	Linear yards of ditches dug and graded.	Average frequency of clearing ditches of grass.
1922 ...	4,500	1,340	About every three months.	15,836	...	Approximate monthly.
1923 ...	...	500	do.	16,267	431	do.
1924 ...	...	933	do.	16,267	1,360	do.

PRIVATE DRAINS—continued. EARTH DRAINS OR DITCHES.

Year.	LAGOS.			CALABAR.		
	Linear yards of ditches cleaned.	Linear yards of ditches dug and graded.	Average frequency of clearing ditches of grass.	Linear yards of ditches cleaned.	Linear yards of ditches dug and graded.	Average frequency of clearing ditches of grass.
1922	4,724	1,000	Approximate monthly.
1923	5,112	388	do.
1924	5,112	436	do.

TABLE IV—(continued.) II. INSPECTIONS AND PROSECUTIONS.

Year.	LAGOS.								CALABAR.							
	No. of Inspectors employed.	No. of houses inspected.	No. of houses where larvae were found.	No. of notices served to remove conditions causing breeding larvae.	No. of persons fined for having mosquito larvae on premises.	No. of notices served to remove insanitary condition of premises.	No. of persons fined for not removing insanitary conditions after notice.	No. of Soda and Aerated factories inspected	No. of Inspectors employed.	No. of houses inspected.	No. of houses where larvae were found.	No. of notices served to remove insanitary conditions causing breeding of larvae.	No. of persons fined for having mosquito larvae on premises.	No. of notices served to remove insanitary conditions on premises.	No. of persons fined for not removing insanitary conditions after notice.	No. of Soda and Aerated factories inspected.
1922 ...	33	652,273	11,753	272	1,359	1,842	78	3	6	100,243	75	..	69	449	16	1
1923 ...	38	586,912	13,817	451	2,181	1,732	115	3	8	103,794	212	..	160	614	9	1
1924 ...	38	461,331	8,824	519	1,225	2,449	194	4	7	109,001	169	..	161	835	11	1

TABLE IV—(continued.)

ANNUAL SANITARY REPORT OF PRISONS FOR 1924.

STATION.			Temporarily Authorised accommodation available according to sanitary standard scale. 1	Average No. of prisoners per night. 2	Site area square yard per prisoner. 3	Percentage of area prison compounds covered by buildings. 4	Average cell space in cubic feet per prisoner. 5	Average ventilation in square feet per prisoner. 6	Total number of prisoners medically treated. 7	Total number of prisoners unfit for duty. 8	Average number of days off duty of prisoners unfit. 9	Death rate per 1,000. 10
Abeokuta ...	...	...	159	143·80	60·7	11·5	492	4·8	1,105	155	3·96	76·92
Agbor ...	...	...	56	100·65	48·7	18·0	253	0·5	506	62	1·36	70·00
Afikpo ...	...	...	97	102·00	37·0	24·4	429	13·0	238	37	5·36	88·23
Aba... ...	...	...	209	228·11	...	...	...	...	622	136	9·23	39·47
Abakaliki ...	...	...	65	161·17	30·4	13·1	211	2·3	673	28	5·43	31·05
Benin-City ...	...	...	108	106·46	38·1	15·5	455	6·6	212	38	5·84	...
Brass ...	...	...	53	32·60	83·5	14·4	736	7·0	54	...	...	...
Bonny ...	...	...	184	27·68	106·	31·2	3094	27·2	20	3	·72	...
Calabar ...	...	...	500	531·03	22·7	18·9	323	4·4	563	425	7·52	28·24
Degema ...	...	...	181	130·64	56·9	24·2	619	10·2	219	64	2·57	15·38
Enugu ...	...	...	317	553·45	34·7	17·5	277	8·1	846	650	22·50	63·06
Forcados ...	...	...	72	27·99	316·	7·3	1153	9·0	66	4	2·25	...
Ibadan ...	...	...	64	29·99	140·	24·3	962	11·8	73	17	·44	68·96
Ifon... ...	...	...	29	44·55	44·8	7·5	305	1·4	91	32	·35	...
Ikot-Ekpene ...	...	...	227	249·56	89·3	10·8	404	8·1	289	141	16·94	60·24
Kwale ...	...	...	97	92·91	50·0	21·6	471	5·6	124	6	·88	...
Lagos ...	...	...	404	353·11	39·5	25·8	509	4·8	484	195	4·20	16·99
Obubra ...	...	...	59	136·09	100·	9·3	236	4·3	340	67	3·09	66·17
Ogoja ...	...	...	131	185·88	360·	14·0	360	4·0	633	39	16·04	...
Okigwi ...	...	...	136	139·83	49·4	...	435	9·3	442	257	9·84	86·33
Ogwashi-Uku ...	...	...	66	79·04	13·9	31·9	294	...	42	1	2·89	12·65
Opobo ...	...	...	209	183·56	20·5	35·6	510	7·0	650	311	7·98	10·92
Onitsha ...	...	...	163	207·79	56·1	27·6	350	5·7	747	175	7·53	38·64
Owerri ...	...	...	201	178·66	63·2	21·4	502	8·5	341	47	30·64	16·85
Port Harcourt ...	...	...	584	590·13	84·3	10·3	425	...	856	212	8·23	44·06
Sapele ...	...	...	245	99·29	99·9	11·5	1101	14·4	244	81	1·49	10·10
Ubiaja ...	...	...	59	110·27	27·9	19·3	238	...	385	88	·93	...
Warri ...	...	...	232	193·57	88·9	5·6	536	10·3	867	228	6·33	15·54

TABLE IV—(continued.)

MOSQUITO INDEX.

Station.	Houses Inspected 1924.	Houses with larvæ 1924.	Rainfall 1924.	Rainfall 1923.	Mosquito Index 1924.	Mosquito Index 1923.
Lagos	461,331	8,724	49·92	71·56	1·8	2·3
Abeokuta	101,628	2,557	42·14	41·74	2·5	3·4
Ibadan	19,086	577	54·28	47·27	3·0	3·2
Ondo	5,843	80	43·13	26·43	1·3	·4
Badagry	11,757	181	...	...	1·5	1·5
Epe	64,163	1,300	...	...	2·0	3·9
Ijebu-Ode	24,766	982	...	...	3·9	4·3
Ado-Ekiti	4,112	20	...	...	0·4	...
Warri	44,739	61	106·66	84·35	0·1	·07
Forcados	11,943	36	178·01	106·29	0·3	·6
Sapele	9,813	30	96·3	73·46	0·3	1·1
Koko	1,286	7	...	...	0·5	·9
Benin-City	11,405	115	81·86	75·27	1·0	·3
Onitsha	30,756	96	...	...	0·3	·1
Siluko	7,283	30	...	...	0·4	·6
Asaba	9,225	15	78·20	57·04	0·1	2·0
Enugu	60,293	215	66·91	62·74	0·3	·4
Agbor	9,375	51	63·96	65·11	0·5	·3
Calabar	109,001	169	136·15	106·92	0·1	·3
Bonny ... ..	...	...	...	150·99	...	·2
Brass	20,426	19	144·32	131·17	0·09	·2
Opobo	15,398	43	108·66	124·32	0·2	·2
Owerri	17,778	139	110·05	88·38	0·7	·5
Degema	13,963	59	113·86	73·96	0·4	·7
Ikot-Ekpene	6,096	20	129·85	92·91	0·3	·1
Ogoja	6,789	16	93·11	...	0·2	·6
Abakaliki	5,512	...	100·68	75·58	...	...
Obubra	3,117	3	98·01	77·56	0·09	·1
Afikpo	1,476	...	88·81	79·78	...	...
Port Harcourt	75,227	916	117·74	80·04	1·2	·5
Ikom	4,916	38	117·84	82·97	0·7	·8
Awka	4,212	38	...	...	0·7	·8
Aba	19,190	223	...	...	1·1	·6

SUMMARY OF VITAL STATISTICS FOR 1924.

										Lagos Township.
Estimated Population (Lagos and Ebute Metta)	...	...	...	...	...	...	...	...	...	105,763
Total Births	...	...	...	...	...	...	...	...	...	3,415
Birth Rate per 1,000 Population	...	...	...	...	...	...	...	...	...	32·2
Total Deaths	...	...	...	...	...	...	...	...	...	3,251
Death Rate per 1,000 Population	...	...	...	...	...	...	...	...	...	26·9
Deaths—Causation of—Certified by Medical Practitioners—number	...	...	...	...	...	...	...	...	...	1,846
Deaths—Causation of—Certified by Medical Practitioners—per cent.	...	...	...	...	...	...	...	...	...	56·7
Deaths—Infants under one year	...	...	...	...	...	...	...	...	...	806
Infantile Mortality per 1,000 births	...	...	...	...	...	...	...	...	...	236·01
Deaths under one year Certified by Medical Practitioners—number	...	...	...	...	...	...	...	...	...	248
Deaths under one year Certified by Medical Practitioners—per cent.	...	...	...	...	...	...	...	...	...	7·6
Deaths—Children under five years	...	...	...	...	...	...	...	...	...	1,108
Percentage of deaths of Children under five years to total deaths	...	...	...	...	...	...	...	...	...	34·08
Total Still-births	...	...	...	...	...	...	...	...	...	158
Still-births proportion % of the total Births (Normal and Still-births)	...	...	...	...	...	...	...	...	...	4·4
Deaths uncertified by Medical Practitioners—number	...	...	...	...	...	...	...	...	...	1,405
Deaths uncertified by Medical Practitioners—per cent.	...	...	...	...	...	...	...	...	...	43·2

TABLE IV.—METEOROLOGICAL RECORDS.

STATION.	Absolute Shade Max.	Absolute Shade Min.	Average Max.	Average Min.	Relative Humidity.	Rainfall inches.
	°	°	°	°	%	
Ilorin	101	51	89·4	62·7	81·9	58·53
Kaduna	100	50	89·1	67·6	66·7	54·55
Maiduguri	115	51	97·3	69·0	57·5	34·28
Kano	108	48	93·1	67·2	49·6	28·06
Lokoja	97	58	89·3	72·4	73·6	62·26
Yola	107	49	93·6	63·9	57·2	38·28
Zaria	105	39	90·7	61·6	56·0	42·98
Zungeru	107	52	94·0	69·2	80·6	51·38
Lagos	99	65·3	87·6	75·9	76	49·92
Forcados	91	60	86·0	71·9	79	178·01
Ibadan	102	64	90·2	70·9	88	54·28
Calabar	97	65	85·4	73·6	83	136·15
Enugu	96	67	88·2	73·7	86	66·91

DEATHS IN LAGOS each week for the YEARS 1921-22-23 & 24.

Deaths for the week ending:-

ANNUAL MEDICAL & SANITARY REPORT 1924.

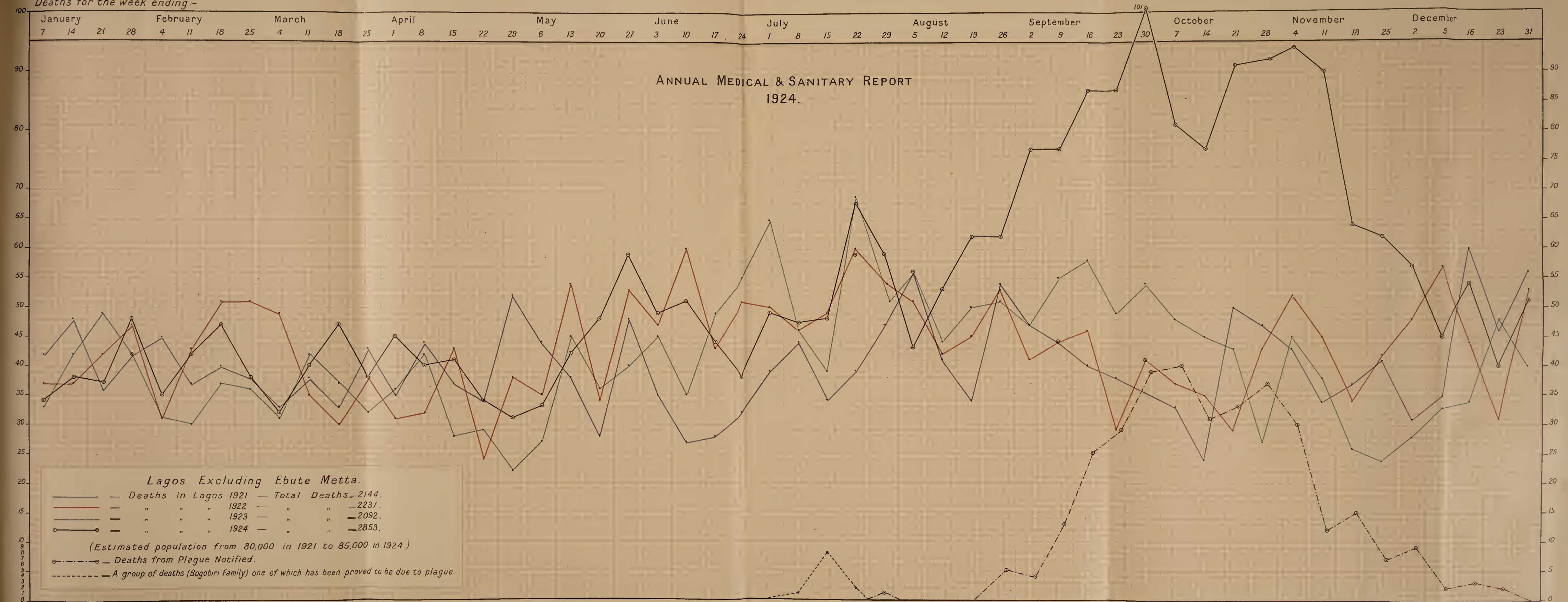
Lagos Excluding Ebute Metta.

—	= Deaths in Lagos 1921	— Total Deaths = 2144.
—	= " " " 1922	" " = 2231.
—	= " " " 1923	" " = 2092.
○—○	= " " " 1924	" " = 2853.

(Estimated population from 80,000 in 1921 to 85,000 in 1924.)

○—○—○ = Deaths from Plague Notified.

----- = A group of deaths (Bogobiri Family) one of which has been proved to be due to plague.





V.—HOSPITALS AND DISPENSARIES.

Station.	Nature of building.	Mosquito proofing.	No. of Beds.		Remarks.
			M.	F.	
Lagos—E. Hospital ...	Brick and Wood	Completely	13	1	Prison has its own E. and N. Hospitals.
Native Hospital ...	Wood and Iron...	Partially ...	53	14	
I. D. Hospital—European	Brick ...	Completely	6	4	
Native ...	" ...	"	25	13	
Massey St. Dispensary ...	" ...	None	...	...
Ereko " ...	" ...	"	...	...
Ebute-Metta " E.	" ...	"	...	...
" " N.	" ...	"	...	...
E. Prison Hos. and Disp.	" ...	"	...	...
N. " " "	" ...	"	...	...
Yaba—L. Asylum, N. ...	" ...	"	24	24	
Leper " N. ...	Mud and Thatch	"	21	12	
Ibadan—E. Hos. and Disp.	Wood on Iron Pillars	Completely	5	...	
Native " ..	Brick ...	"	16	4	
Abeokuta—E. Hospital ...	None ...	...	...	...
Native " ...	Mud, Iron Roof...	None	8	4	
Warri—E. Hospital ...	Concrete ...	Completely	6	...	
Native " ...	Brick ...	Partially ...	24	6	
I. D. Hospital ...	" ...	"	20	...	
Sapele—E. Hospital ...	" ...	Completely	4	...	
Native " ...	" ...	Partially ...	16	2	
I. D. Hospital ...	" ...	"	8	...	
Onitsha—E. Hospital ...	Brick and Wood	Completely	3	1	
Native " ...	Concrete & Wood	"	19	5	
Forcados—E. Hospital ...	Concrete ...	"	4	...	
Native " ...	Brick ...	"	12	4	
Agbor—E. Hospital ...	None ...	...	...	...
Native " ...	Brick ...	None	6	...	
Benin City—E. Hospital...	None ...	...	...	...
Native " ...	Brick ...	Partially ...	8	...	
Enugu—E. Hospital ...	" ...	None	6	...	Railway Construction Hospital, Station Hospital, Construction Hospital, Railway.
Native " ...	" ...	"	8	...	
" " ...	Mud and Pan and Grass roof	"	22	...	
Calabar—E. Hospital ...	Wood ...	Completely	6	2	Lunatic Asylum—Brick and Iron roof—30 beds—15 Males, 15 Females. Prison has its own E. and N. Hospitals
Native " ...	Brick ...	"	46	11	
I. D. Hospital ...	" ...	None	50	16	
Bonny—N. Hospital ...	Brick ...	Partially ...	9	4	
I. D. Hospital ...	" ...	None	8	4	
Brass—N. Hospital ...	" ...	"	8	...	
Degema—N. Hospital ...	" ...	"	28	6	
Ikot-Ekpene—N. Hospital	" ...	"	16	3	
Opobo—E. Hospital ...	" ...	Completely	4	...	C ed at present.
Native " ...	Iron ...	None	6	2	
Owerri—N. Hospital ...	Bush ...	"	...	...
P. Harcourt—E. Hospital	Wood and Iron...	Completely	6	...	
Native " ...	" "	Partially ...	...	...
I. D. Hospital ...	Bush ...	None	...	...
Obubra—N. Hospital ...	Brick ...	"	8	2	
Ikom " "	Bush ...	"	10	...	
Obudu " "	" ...	"	10	...	
Okigwi " "	" ...	"	10	...	
Ogoja " "	" ...	"	10	...	
Abakaliki—N. Hospital ...	" ...	"	10	...	
Victoria—E. Hospital ...	Brick ...	"	6	...	
Native " (16)	" ...	1 Completely	401	...	15 N. Hospital plantations.
I. D. Hospital ...	Iron ...	None	99	...	
Buea—N. Hospital ...	" ...	"	10	...	
Bamenda—N. Hospital ...	Bush ...	"	20	4	
Mamfe " "	Iron ...	"	4	...	
Afikpo " "	Bush ...	"	8	...	

V.—HOSPITALS AND DISPENSARIES—*continued.*

Station.	Nature of building.	Mosquito proofing.	No. of Beds.		Remarks.
			M.	F.	
Kaduna—E. Hospital ...	Brick ...	Completely	12	...	
Native " ...	" ...	Partially ...	36	4	
Kano—E. Hospital ...	Concrete ...	None ...	5	...	
Native " ...	Brick ...	Partially ...	26	2	
I. D. Hospital ...	Mud and Thatch	None ...	19	...	
Lokoja—E. Hospital ...	Wood ...	Partially ...	10	...	
Native " ...	Brick ...	" ...	48	4	
Sokoto—N. Hospital ...	Mud and Thatch	None ...	12	...	
Ilorin " "	Cement ...	" ...	12	...	
Offa " "	Bush ...	Partially ...	6	..	
Ibi " "	Brick ...	" ...	6	...	
Yola " "	Stone ...	None ...	10	...	
Bauchi " "	Brick ...	" ...	6	...	
Zaria " "	Brick and Mud...	Partially ...	16	...	
I. D. Hospital ...	Thatch ...	None ...	12	...	
Naraguta—N. Hospital ...	Grass ...	" ...	20	...	
Keffi " "	Mud and Thatch	" ...	10	...	
Zungeru " "	Brick ...	" ...	10	...	
Minna " "	Cement ...	" ..	12	...	
Ankpa " "	Mud and Thatch	" ...	12	...	
Maiduguri " "	Brick ...	" ...	12	...	

VI.—SCIENTIFIC.

By Dr. Maples	1	Inguinal Hernia.
	2	Splenectomy.
	3	Pneumococcic Infections.
	4	Cirrhosis of the Liver.
By Dr. G. F. Forde	1	Malignant Tumour of Pancreas & Liver.
By Dr. Ferguson	1	Amoebic Abscess of Spleen.
	2	Appendicitis.
	3	Incontinence of Urine.
	4	Atresia Vagina.
	5	Malignant Disease of Pancreas.
By Dr. G. Wilson	1	Spina Bifida
	2	Aneurysmal Varix.
By Dr. Grieve	1	Microfilaria.
	2	Trypanosomiasis in a dog.
By Dr. Gallagher	1	Fractured Base.
	2	Nodular Leprosy.
By Dr. Courtney	1	Beri Beri.
By Dr. W. R. Parkinson	1	Large Fibromyomata of uterus.
	2	Tetanus.

APPENDIX I.

ANNUAL REPORT OF THE MEDICAL RESEARCH
INSTITUTE, LAGOS,

By

ANDREW CONNAL, M.D., D.P.H., D.T.M., AND H.

MEDICAL RESEARCH INSTITUTE.

PLAGUE.

For the first time in its history, as far as records show, Lagos suffered from an epidemic of Plague. It occurred in the latter half of the year. The first definite case, bubonic in type, was found on 28th July. The disease was in all probability introduced by sea, its presence in at least two other West African Colonies being known.

During the four months preceding the outbreak, over 300 rats were examined in Lagos but no evidence of a plague epizootic in these animals was obtained.

Speculation as to the actual source of the epidemic is inconclusive and the lapse of time has merely broadened the speculative element.

It is not without significance, however, that, both previous to, and during the visitation, cases of more or less sudden death occurred among the native population. Most of these cases were brought to the Public Mortuary, and in a proportion, post-mortem examination revealed the presence of a broncho-pneumonia. Smears, sections and cultures in some cases failed to show *Bacillus pestis*, the organisms actually found being highly mixed and numerous. There is still much to be learned regarding the epidemiology of Plague, and the following discussion is interesting, in connection with the present outbreak.

F. Norman White (Report presented to the Health Committee of the League of Nations, Geneva, 1923) considers the two types, the Bubonic and the Pneumonic, so markedly different in behaviour as to constitute two different diseases. He attributes this difference to the presence of another organism which is necessary to the Plague bacillus, in the Pneumonic form.

Experience in Lagos has shown that during the course of the epidemic most of the cases are typical, presenting no difficulty in diagnosis, the smear from the bubo or from the sputum as the case may be, showing practically no other organism than *B. pestis*, and that in enormous numbers. Earlier and later cases, however, may offer considerable difficulty, the *Bacillus pestis* in some instances being few in number, atypical in morphology and being greatly admixed with other organisms. This is more frequently seen in the sputum than in the pus from the bubo. It is possible, therefore that at both extremes, but more particularly at the beginning than at the latter part of an epidemic, the action of another organism is necessary in Pneumonic Plague.

There is, however, little or no evidence of this additional organism at the height of the epidemic, so that, if it do exist, it is probably for the purpose, at the beginning, of assisting in the establishment of the Pneumonic form, and towards the end, of enabling it to persist when the curve of the epidemic is falling. Reports from other parts of the world have some bearing on the local problem.

Nicolle and Gobert (*Arch. Inst. Pasteur de Tunis*, 1924, Volume 13 No. 2) discussing several scattered foci of the disease in Tunis, adopt F. Norman White's conception, and advance it a step further in that they regard the influenza virus as the agent in the association.

Cintra (*Bol. Soc. Med. e Cirurg. de S. Paulo*, 1920-21, Volume 3) reports an outbreak of virulent pneumonia at S. Paulo. It was at first thought to be influenzal in origin. Later, it was proved to be due to the bacillus of Yersin. Cintra considers the possibility of the bacilli being modified in Pneumonic Plague and more virulent than strains in the bubonic form.

Allain (*Ann. de. Med. et de Pharm. Colon.* 1921, Vol. 19, No. 4) gives a description of an outbreak in Tananarive. There were 46 cases, all fatal. The first indication was a heavy mortality in two families.

The disease was at first thought to be virulent pneumonia. In later cases the plague bacillus was demonstrated. There was no rat epizootic at the time.

Mercandier (Arch. Med. et Pharm. Nav., 1918, Nos. 2 and 3), reporting the 1914-15 outbreak of Plague at Dakar, states that the pulmonary form was most in evidence at the beginning. The murine epizootic was first noticed two and a half months after the human outbreak, and the bubonic cases coincided with the murine.

In Lagos the bubonic cases coincided from the start and also ran concurrently with the disease in the rats.

It is possible, however, that certain atypical cases of the pneumonic form occurred before either.

A description of the clinical aspect of the cases is in other hands.

The post-mortem findings are described in Dr. Morrison's report on the working of the Clinical Laboratory in Lagos.

In these examinations it was the routine procedure to incise any glandular swelling seen or felt and in any case to incise over inguinal, axillary and cervical regions. Thereafter the internal organs were examined. Smears made from these and from the glands were stained both by Carbol Thionin Blue and by Gram's method. In a certain proportion, cultures were also made.

During the height of the epidemic, as many as twelve to fifteen post-mortem examinations were done in a day by Dr. Morrison, a task requiring some physical endurance.

In addition to these, a number of post-mortems were done by other medical officers, namely twelve by the Medical Officer, Ebute Metta, two by the Medical Officer, Abeokuta, and one by the Medical Officer, Ibadan.

Smears from the organs and glands yielded positive results from five Ebute Metta cases, one Abeokuta and one Ibadan case. These were all traced to Lagos as their source and the places mentioned remained free from local infections.

As regards the causative organism itself, morphologically, in staining reactions and in culture on various media, it agreed with textbook descriptions in every way except that towards the end of the year it was more difficult to isolate on nutrient agar-agar. In fact, on several occasions although numerous *B. pestis* were found in the smear from the glands or the spleen, no growth of the organism took place on the medium.

A series of inoculation experiments was carried out on Monkeys and on Guinea-pigs locally obtained. As these experiments are still in progress, it will suffice, for the present, to give bare facts and figures.

On 22nd November a sub-acute inguinal bubo from a case of human plague, was obtained post-mortem. Smears from the bubo showed numerous plague bacilli, mainly involution forms. The bubo was ground in a mortar with five c.c. of normal saline solution. Two amounts of 0.5 c.c. of this suspension were injected, one by each nostril well back into the nasal passages of Monkey A. (*Cercopithecus tantalus*). At the same time Guinea-pig A. was inoculated from the suspension by scarification of the abdomen.

The Monkey A. survived seven days. Signs of illness (fever, rapid breathing, refusal of food) appeared on the fifth day. Post-mortem, the cervical, axillary and inguinal glands were swollen and deeply congested but there was no surrounding infiltration. Both lungs were markedly congested, but there was no actual consolidation. There was an excess of sanious fluid in both pleuræ and pericardium with petechiæ on both membranes. The bronchial glands were intensely congested and œdematous. Both liver and spleen were

enlarged and engorged. *Bacillus pestis* was present in enormous numbers in smears from the lungs, the bronchial glands, the liver, the spleen and in the blood from the heart.

The Guinea-pig A. died in five days. There was a large hæmorrhagic, friable glandular swelling in the neighbourhood of the scarification, involving the left inguinal group of glands. The glands in the other inguinal and in both axillary areas were congested. The liver and spleen were both enlarged, congested and showed small greyish-yellow spots on the surface. There was some congestion of both lungs. There was excess of free fluid in the serous cavities. *B. pestis* was present in great numbers, in smears from the bubo, the liver and the spleen, but in smears from the lungs and from the heart-blood, the organisms were few.

On 27th November, the day on which Guinea-pig A. died, its bubo was ground up in saline. The trachea of Monkey C. (*C. tatalus*) was exposed by an incision and 0.5 c.c. of the suspension from the bubo was injected downwards towards the bronchi. Death occurred three days later. The axillary and cervical glands were congested but not the inguinal. Both lungs were markedly inflamed the condition being a broncho-pneumonia. The bronchial glands were acutely inflamed, with hæmorrhages and infiltration around. There was free reddish fluid in both pleuræ and pericardium. The liver and spleen were enlarged and congested. Smears from the lungs, the bronchial glands and the spleen showed enormous numbers of *B. pestis* but there were few in smears from the liver, the axillary glands and the blood from the heart.

Guinea-pig C. on 27th November also, was inoculated after scarifying the abdomen, with the same material as was used to infect Monkey C. Guinea-pig C. survived nine days. Post-mortem there was the usual large hæmorrhagic bubo near the site of inoculation and the other main groups of lymphatic glands showed congestion. The spleen was enlarged and very markedly speckled. The liver was also enlarged but showed only a few white spots. In the middle lobe of the right lung, there was an abscess of the size of a small pea. There was free fluid in both pleuræ and pericardium. *B. pestis* was very numerous in smears from the bubo and from the lung abscess, but there were few organisms in smears from the liver and the heart-blood. In the spleen smears the infection was focal, the plague bacilli being present in isolated collections.

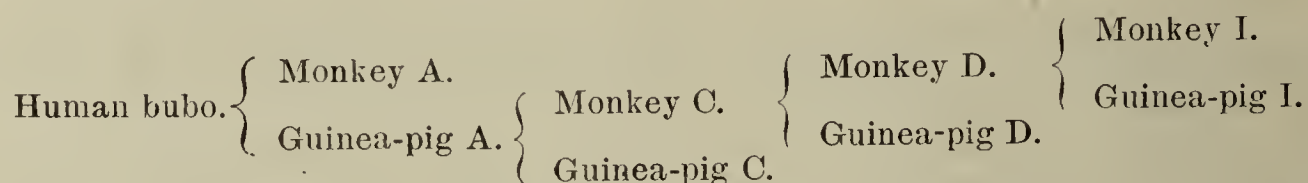
On 30th November, the day on which Monkey C. died, portions of its spleen, lungs and bronchial glands were ground in saline and 0.5 c.c. of the mixture introduced into each nostril of Monkey D. (*C. patas*). Guinea-pig D. was inoculated at the same time from the same material, in the usual way, by scarification of the abdomen.

Monkey D. died on the fourth day. Post-mortem, there was congestion of cervical, axillary and inguinal glands. Both lungs were intensely congested particularly the left, in which there was the appearance of red hepatitis. There was congestion of the bronchial glands. There was straw coloured free fluid in both pleuræ and pericardium. The liver and spleen were enlarged, deeply congested and friable. *B. pestis* was numerous in the smears from the lungs and the spleen, but few were seen in the smears from the liver and from the heart.

Guinea-pig D. died on the sixth day. There were the typical bubo, speckled liver and spleen and free fluid in serous cavities. There was, however, in addition, a localised consolidated patch in the middle lobe of the right lung.

On 4th December, pieces of each lung of Monkey D. were ground in saline and 0.5 c.c. of the juice was injected directly into the right lung, in the mid-axillary line of Monkey I. (*Papio* sp.). At the same time Guinea-pig I. was inoculated with the juice, by scarification of

the abdomen. Monkey I. died on the fourth day. Post-mortem, there was general congestion of the lymphatic glands but there were no buboes. There was thick yellowish exudate on the right pleura. The lower lobe of the right lung was solid and the upper and middle lobes were nearly so. The left lung was congested. The liver and spleen were enlarged, congested and friable. There was much free fluid in the abdomen. Smears showed *B. pestis* innumerable in the lung and scanty in liver, spleen, heart-blood and axillary glands. Guinea-pig I. died on the eighth day. The bubo was yellowish and friable, the spleen was speckled and the liver congested. Both lungs were congested and showed on their surface a number of coarser spots than those seen on the spleen. *B. pestis* was very abundant in smears from the lungs, the bubo and the spleen, but there were very few organisms in smears from the liver and the heart-blood.



The order of transmission is graphically shown above. The original infected material was a human bubo. Intra-nasal inoculation resulted in lung infection of a Monkey, and skin inoculation caused a bubonic infection in a Guinea-pig.

The second source of infected material was the bubo of the Guinea-pig. Intra-tracheal inoculation caused lung infection of a Monkey and skin inoculation a bubonic infection of a Guinea-pig with, in addition, an abscess of the lung.

Material for the third passage was composed of the lung, spleen and bronchial gland from the second monkey. Intra-nasal inoculation induced a plague pneumonia in a monkey and skin inoculation a bubonic infection in a guinea-pig, with a pneumonic patch.

Lung from the third monkey was used for the fourth passage. Intra-pulmonary inoculation brought about a pneumonia in a monkey and skin inoculation, a bubonic infection in a guinea-pig, in which animal there were minute abscesses in the lungs.

The strain of *B. pestis* used, therefore, appeared to be capable of producing lung lesions even when inoculated on the scarified skin of the abdomen in guinea-pigs.

This strain was kept up in guinea-pigs as shown below.

Guinea-pig C—Guinea-pig K—Guinea-pig TE—Guinea-pig X—
Guinea-pig AA.

Guinea-pig D—Guinea-pig L—Guinea-pig S—Guinea-pig Y.

Monkey I—Guinea-pig N.

Guinea-pig I—Guinea-pig R.

Guinea-pig C. died on 6th December. The bubo excised from its inguinal region was rubbed over a scarified area on the abdomen of Guinea-pig K. The latter animal survived eight days. There were the usual signs, post-mortem a bubo at the site of inoculation, a speckled spleen, a red enlarged liver and somewhat congested lungs. Smears from these organs (the lungs), however, showed fewer bacilli than the smears from the spleen and the bubo. Guinea-pig TE was inoculated from Guinea-pig K. in the manner above described and it died in seven days. Post-mortem: there was, in addition to the local bubo, marked speckling of liver, spleen and lungs. Smears from all three organs showed numerous *B. pestis* particularly in the lung.

Guinea-pig X. was inoculated in the usual way from Guinea-pig T.E. Death occurred in four days. The bubo was hæmorrhagic, the spleen was speckled but there were no surface spots on lungs or liver. *B. pestis* was numerous in smears from the bubo but were not noted in smears from spleen, liver, lung and blood.

Guinea-pig AA. infected in the usual way from Guinea-pig X, died on the fourth day. Both liver and spleen were speckled and the right lung was congested. Smears from the usual five sources, bubo, spleen, liver, lung and blood, showed numerous *B. pestis* in all.

The strain was kept up in Guinea-pig D.A. which was still alive at the end of the year.

Thus in a direct passage through six guinea-pigs, of material from a human bubo, the lungs were attacked in five, although in all cases the infection was a general one, *i.e.*, not localised. The same strain, but passed through Monkey C., as already described, was continued from Guinea-pig D. to Guinea-pig L. in the usual manner. Guinea-pig L. survived nine days. The bubo was semi-purulent and the spleen was speckled. Some congestion of both lungs was present. *B. pestis* occurred in large numbers in the spleen and the liver (mainly coccoid in form) but only a few organisms were present in smears from the bubo, the lungs and the blood.

Guinea-pig S. inoculated from Guinea-pig L. died in seven days. There was marked speckling of spleen, liver and lungs, post-mortem, and the bubo was acute.

All the smears except from the blood (bubo, spleen, liver and lungs) showed very numerous *B. pestis*.

Guinea-pig Y inoculated in the usual direct way from Guinea-pig S. lived four days. Post-mortem, the bubo was hæmorrhagic, the spleen speckled, the liver large and red, and there was definite congestion of the lower lobe of the right lung. *B. pestis* occurred in all the usual smears (bubo, spleen, liver, lung and blood). Guinea-pig B.A. was inoculated from Guinea-pig Y. and was still alive at the end of the year.

Thus in all four Guinea-pigs of this series the lungs were definitely affected, although only as part of a general infection. An attempt at intrapulmonary infection of a guinea-pig failed. Lung juice from Monkey I. (0.25 c.c.) was injected into the right lung of Guinea-pig N. The animal died some twenty-four hours later from hæmorrhage. In the last series of experiments with this strain, the bubo of Guinea-pig I. was rubbed on a scarified area of the abdomen of Guinea-pig R. Guinea-pig R. died in seven days but the lungs were not obviously affected. The carcase of this animal, owing to a misunderstanding, was destroyed before passage could be made to another guinea-pig.

Another experiment was begun on 24th November. Monkey B. (*Cercopithecus tantalus*) was inoculated intra-tracheally, with a saline suspension from a very acute human bubo. The animal died two days later. Post-mortem, the outstanding features were red hepatisation of the left lung and a gelatinous mass, mainly glandular, extending from the pericardium to the root of the neck. Both liver and spleen were enlarged and congested. Plague bacilli were abundant in smears from the lung, the gelatinous œdematous mass of bronchial glands, the liver, the spleen and the blood.

Guinea-pig B. inoculated at the same time with the same material as Monkey B., but through a scarified area on the abdomen, survived six days. The post-mortem appearances were, acute bubo at site of inoculation, typical white-spotted spleen, enlarged red liver, and congested lungs. There were petechial hæmorrhages on serous surfaces and excess of free fluid in serous cavities. *B. pestis* was abundant in smears from bubo, spleen, liver, lungs and heart-blood. This strain was not carried any further.

On 30th November, Monkey E. (*Cercopithecus mona*) was inoculated by the intra-tracheal route with lung juice from a human case of Pneumonic plague, along with the mixed juice of a bubo from two human cases of Bubonic plague. Guinea-pig E. was inoculated at

the same time with the same material, on a scarified area of the abdomen. Monkey E. died in five days, with a general infection. The cervical axillary, inguinal and bronchial glands were all intensely congested and swollen. The liver and spleen were enlarged, engorged and friable. Both lungs were congested and there was free fluid in pleuræ and pericardium. Plague bacilli were numerous in smears from the organs and the glands, and in the heart-blood.

Guinea-pig E. succumbed in ten days. There was a large firm bubo, curdy on section, and the liver and spleen were typically speckled. The lungs were not obviously congested. Smears from the bubo showed abundant *B. pestis*, but those from lung and blood showed none. In the spleen and the liver, the grouping of the bacilli was focal, apparently in conformity with the macroscopic appearance of speckling.

Guinea-pig J. was inoculated in the usual way with cervical gland from Monkey E. The illness lasted nine days. Post-mortem, the bubo was caseous in the centre, the spleen was profusely speckled, the liver slightly so and both organs were remarkably friable. The left lung showed a few coarse speckles. *B. pestis* was found in smears from bubo, spleen, liver, lung and blood.

Guinea-pig UE. was inoculated in the usual way from Guinea-pig J. Death occurred on the fifth day. Post-mortem, in addition to the bubo and the speckling of liver and spleen, there was distinct congestion of the right lung. The usual smears showed *B. pestis* numerous in all.

Guinea-pig Q. was inoculated in the usual way from Guinea-pig E. Death took place on the fourth day. The condition was an acute one, there being hæmorrhage and œdema in the neighbourhood of the bubo, and congestion of all the organs. Bi-polar bacilli were numerous in the usual smears, the organisms in the spleen and liver being mostly coccoid. No further experiments were done with these mixed strains.

On the same day, however, on which they were begun three guinea-pigs were inoculated with the single strains.

Guinea-pig F. was inoculated from the human lung, Guinea-pig G. from one of the human buboes and Guinea-pig H. from the other. The inoculation was done, as usual, by rubbing the infective material on a scarified area of the skin of the abdomen.

Guinea-pig F. (human lung) died in nine days. There were the customary appearances, post-mortem, bubo at site, speckled spleen and liver, free fluid in serous cavities and in addition there was acute congestion of both lungs. Smears showed the bacilli most numerous in the bubo and the lungs.

Guinea-pig P. inoculated from Guinea-pig F. had an illness lasting six days. The post-mortem appearances closely resembled those seen in Guinea-pig F. and plague bacilli were numerous in all the usual smears.

Guinea-pig T. inoculated from Guinea-pig P. died in five days. The liver was not speckled and the lungs were not so congested as in Guinea-pigs F. and P., and *B. pestis* was abundant only in the smears from the bubo and the spleen.

Guinea-pig W. was inoculated from Guinea-pig T. A fatal issue arrived in three days. The condition was an acute one, small buboes being present in both inguinal regions and all the organs being congested. *B. pestis* occurred in all the smears, being most numerous in the bubo.

Guinea-pig G. inoculated from human bubo died on the ninth day. There were the usual appearances, bubo at site, speckled liver and spleen, free fluid in cavities and in addition there was marked congestion of the right lung. Smears showed *B. pestis* most numerous in bubo and lung, the bacilli being focal in the spleen. Guinea-pig O. was

inoculated in the adopted manner from Guinea-pig G. The animal survived a week. There were the usual post-mortem findings, including congestion of the lungs but plague bacilli were remarkably few in all the smears.

Guinea-pig V. inoculated from Guinea-pig O., died in eight days. The bubo was caseous in the centre, the liver and spleen were not speckled and the left lung was congested. *B. pestis* occurred in small numbers in the smears from the bubo but it and the other smears all showed a mixture of organisms.

Guinea-pig Z. inoculated from Guinea-pig V., succumbed after four days. The bubo was an acute one, glandular inflammation was general, the spleen was speckled and the liver and lungs were congested. There were no contaminative organisms in the smears and *B. pestis* was most numerous in bubo and spleen.

Guinea-pig CA. inoculated from Guinea-pig Z., was still alive at the end of the year.

Guinea-pig H. inoculated from other human bubo, died in seven days. The post-mortem findings were the usual bubo congestion but no speckling of liver and spleen, and there was consolidation of the right lung. Smears showed *B. pestis* in all the organs, but there was contamination evident in the smears from the bubo.

Guinea-pig M. inoculated from Guinea-pig H, died in eight days. Liver, spleen and lungs were speckled. All the smears showed numerous *B. pestis*.

Guinea-pig U. inoculated from Guinea-pig M., had an illness lasting five days. The bubo was intensely hæmorrhagic, the spleen was speckled and the liver and right lung were congested. Smears from the usual organs showed numerous *B. pestis*, those in the spleen being mainly coccoid.

The above is a short description of the experimental work done on Plague in laboratory animals, and as the investigations are still proceeding, no conclusions are given, except that a lung infection can be caused in guinea-pigs by inoculating material from a bubo through a scarified area on the skin of the abdomen. It is also worthy of note that, on occasions, the distribution of *B. pestis* in the spleen may not be, as is usual, general, but may be focal so that a number of fields may require searching, microscopically, before the organisms are seen.

REPORT ON THE SPECIES AND PARASITES OF RODENTS ASSOCIATED WITH PLAGUE.

A survey of the rodents within the town of Lagos was begun early in August, 1924. It was some time, however, before the system of trapping, poisoning, collecting, numbering and examining attained to proper working order. Therefore, in the tabular statements and comments which follow, four periods are taken instead of five separate months, namely August, September, October, November and December.

Three districts were systematically treated, Lagos, Iddo and Ebute Metta, all of which are within the Municipal Boundary, although separated from each other by an expanse of water.

As regards Lagos itself, efforts at rat-destruction were confined to that portion lying north westward of the MacGregor Canal, that is, the thickly populated region of the island, and it included the wharves. Customs sheds and the trading stores.

Iddo is a smaller island than Lagos, connected with it by a bridge about half-a-mile in length. The island is a railway terminus with

sheds and offices, wharfage and Customs sheds, and it also accommodates the electric power station and a number of bungalows. At one part there are some native houses. Trapping was mainly confined to the business area.

Ebute Metta is on the mainland, connected with Iddo by a short bridge. Rat-catching was done principally in the native town and in the trading stores.

The epizootic in the rats occurred both in Lagos and Iddo but not in Ebute Metta.

Human cases of Plague occurred only in Lagos.

Very few live rats were taken, a result which was due to a scarcity of suitable traps and to the cunning of the animals. The great bulk of the catch consisted of rats killed by "break-back" traps, or picked up after the laying of poisoned bait.

Many hundreds of rats were destroyed without having been examined.

As regards other parts of Nigeria, Dr. Braithwaite at Warri, Dr. Wynne-Davies, O.B.E., at Lokoja, Dr. Fetherston-Dilke at Maidugari, Dr. Thomson at Jos and Dr. Booth at Ibadan sent one or more collections of rats.

The total number of rodents examined is 13,291, of which number all but 144 came from within the Municipal Boundary of Lagos. The rodents which have been obtained are the black rat, *Rattus rattus*, the brown rat, *Rattus norvegicus*, the mouse, *Mus musculus*, a shrew, *Crocidura manni*, (identified at the British Museum, Natural History), and the pouched rat, *Cricetomys gambianus*. With regard to *R. rattus*, several varieties were encountered. Mr. Martin A. C. Hinton kindly examined a number of specimens sent to him at the British Museum. He reports that they were all forms of *R. rattus*, nearest to *R. rattus frugivorus*, but not accurately determinable.

Table I shows the number of rodents examined in Lagos.

TABLE I.

	AUG.-SEPT.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
	Total.	%	Total.	%	Total.	%	Total.	%	Total.	%
Black rat...	1,200	55.37	1,358	54.80	1,250	43.93	960	26.67	4,768	42.99
Brown rat	488	20.67	125	5.04	65	2.28	54	1.50	692	6.24
Shrew	—	—	217	8.75	314	11.03	295	8.19	826	7.44
Mouse	519	23.95	778	31.39	1,216	42.74	2,290	63.62	4,803	43.31
Total	2,167	99.99	2,478	99.98	2,845	99.98	3,599	99.98	1,089	99.98

During the first and second periods the black rat accounts for more than half of the total, in the third period its preponderance is less marked and in the fourth period only about one quarter of the total was made up by this species.

The brown rat diminished in numbers even more decidedly and equally steadily from a fifth of the total in the first period to a seventy-fifth in the final month.

This decline in both species of rats is possibly due to a definite lessening of their numbers, but is also in part explained by both alarm and cunning. The shrew was not differentiated from the rats in the first period but it appears in fair numbers in the last three months. It outnumbered the brown rat at all times.

The mouse shows a steady increase in numbers from the beginning, rising from a fourth of the total in the first period to nearly two-thirds in the last.

The final totals show the black rat and the mouse in about equal proportions and accounting for 85% of the total.

Table II gives the details concerning the rodents from Iddo.

TABLE II.

	OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
	Total.	%	Total.	%	Total.	%	Total.	%
Black rat ...	124	63·91	222	56·48	94	48·95	440	56·49
Brown rat ...	4	2·06	13	3·30	2	1·04	19	2·45
Shrew ...	11	5·66	68	17·30	38	19·79	117	15·01
Mouse ...	55	28·35	90	22·90	56	29·16	201	25·80
Pouched rat ...	—	—	—	—	2	1·04	2	0·25
Total ...	194	99·98	393	99·98	192	99·98	779	100·00

Rat destruction was commenced at Iddo in October so that three monthly periods are available for data. The black rat outnumbered all the other species together, except in December when it only reached 49% of the total. The brown rat proved to be scarce. The shrew appeared in relatively greater numbers than in Lagos. The mouse accounted for about one quarter of the total rodents, in each period. Two specimens of the pouched rat were obtained. The final figures show that the black rat made up more than half of the total, the mouse one quarter, and the shrew was the next in order of frequency.

Table III shows the monthly catches in Ebute-Metta.

TABLE III.

	November.		December.		Total.	
	Total.	%	Total.	%	Total.	%
Black rat ...	115	30·83	298	32·89	413	32·29
Brown rat ...	4	1·07	10	1·10	14	1·09
Shrew ...	3	0·80	24	2·64	27	2·11
Mouse ...	251	67·29	574	63·35	825	64·50
Total ...	373	99·99	906	99·98	1,279	99·99

The rat crusade was not begun in Ebute Metta until November, so that there are only two monthly periods for comparison. The mouse outnumbers the black rat by about two to one, the brown rat is scarce and the shrew only a little less so.

Contrasting the final figures in each of the three districts it will be seen that in Lagos the black and brown rat together make up nearly one half of the total rodents, in Iddo they account for nearly three-fifths, and in Ebute Metta for only one-third.

Table IV gives the details of all three districts.

TABLE IV.

	AUG.-SEPT.		OCTOBER.				NOVEMBER.				DECEMBER.				TOTAL						
	Lagos.	%	Lagos	Iddo	Total.	%	Lagos.	Iddo	Ebute Metta.	Total.	%	Lagos.	Iddo	Ebute Metta.	Total.	%					
Black rat ...	1,200	55.37	1,358	124	1,482	55.46	1,250	222	115	1,587	43.94	960	94	298	1,352	28.78	4,768	440	413	5,621	42.75
Brown rat ...	448	20.67	125	4	129	4.82	65	13	4	82	2.27	54	2	10	66	1.40	692	19	14	725	5.51
Shrew ...	—	—	217	11	228	8.53	314	68	3	385	10.66	295	38	24	357	7.60	826	117	27	970	7.37
Mouse ...	519	23.95	778	55	833	31.17	1,216	90	251	1,557	43.11	2,290	56	574	2,920	62.16	4,803	201	825	5,829	44.33
Pouched rat ...	—	—	—	—	—	—	—	—	—	—	—	—	2	—	2	0.04	—	2	—	2	0.01
Total ...	2,167	99.99	2,478	194	2,672	99.98	2,845	393	373	3,611	99.98	3,599	1,992	906	4,697	99.98	11,089	779	1,279	13,147	99.97

Comparing the final figures in this table, it will be observed that although the Iddo and Ebute Metta figures differ from those in Lagos, the final percentages of all three districts grouped together are very little different from those of Lagos alone. Although no notes were made as regards the sexes in the period under review, some idea may be gained from a number of rats examined earlier in the year. Two hundred and ninety-three rats were sent to the Laboratory between April and June, and although no note was made as regards the species, the proportion of the sexes worked out at 119 males to 174 females.

PLAGUE INFECTION.

The epizootic was noted in the Lagos and the Iddo rodents, but not in those from Ebute Metta. It may be mentioned here that although Iddo is farther from Lagos than it is from Ebute Metta, there is considerably more traffic in goods between it and Lagos, both by water and by road.

Table V gives the figures regarding plague-infected rodents in Lagos.

TABLE V.

	AUGUST-SEPTEMBER.			OCTOBER.			NOVEMBER.			DECEMBER.			TOTAL.		
	Total.	Infected.	%	Total.	Infected.	%	Total.	Infected.	%	Total.	Infected.	%	Total.	Infected.	%
Black Rat ...	1,200	17	1·41	1,358	56	4·12	1,250	42	3·36	960	13	1·33	4,768	128	2·68
Brown Rat...	448	10	2·23	125	5	4	65	4	6·15	51	...	...	692	19	2·74
Shrew ...	...	...	...	217	3	1·38	314	3	0·95	295	...	...	826	6	0·72
Mouse ...	519	6	1·15	778	15	1·92	1,216	6	0·49	2,290	2	0·08	4,803	29	0·60
Total ...	2,167	33	1·52	2,478	79	3·18	2,845	55	1·93	3,599	15	0·41	11,089	182	1·64

Infected individuals were found in all four species of rodents but there was a higher rate in the rats than in the mice and shrews. The total infected and the percentage infected were highest in the October period, falling steadily through November and December. The highest rate of infection was reached in the brown rat during November. The final figures show that infection occurred in about equal proportion in the black and the brown rat, and this proportion was about four times greater than in the mouse or the shrew.

The figures as regards the epizootic in the rats followed very closely those of the epidemic in the human subject, a rise in the rat figures usually preceding by one week a rise in the human cases. This is well seen in Chart I. (Page 13)

TABLE VI.

	October.			November.			December.			Total.	
	Total.	Infected.	%	Total.	Infected.	%	Total.	Infected.	%	Total.	Infected.
Black Rat...	124	5	4.03	222	12	5.40	94	5	5.31	440	22
Brown Rat	4	...	...	13	1	7.69	2	...	...	19	1
Shrew	11	1	9.09	68	1	1.47	38	...	...	117	2
Mouse	55	...	...	90	...	...	56	...	...	201	...
Pouched Rat	...	...	...	...	...	...	2	...	...	2	...
Total	194	6	3.09	393	14	3.56	192	5	2.60	779	25
	...	...									3.29

The above data show a distinctly higher percentage of infected rats than in Lagos, but the total numbers on which the percentages are based are comparatively small. The rise and fall which appeared in the Lagos figures were not observed, and, in addition no infected mice were found.

No infected rats were found in Ebute Metta.

ECTO-PARASITES.

Fleas and Lelaps were recovered from the rodents. The collections of the latter are small (18 in number) and they consist of Lelaps echidninus only.

Fleas were collected in the latter part of September and throughout October, November and December. Only fifteen live rats were obtained during that period and the great bulk of the collection was obtained from dead rats. The procedure was as follows:—

The disinfectant in which the rodents were brought to the Laboratory was put through a sieve. The retained matter was then washed out into a white basin from which insects were picked out.

Fifteen live rats provided 68 fleas and the remainder of the total of 819 from Lagos and Iddo came from dead hosts.

Thirty-one fleas were collected in September as follows:—

Xenopsylla cheopis	...	8♂♂	5 ♀♀	total	13.
,, brasiliensis	...	12♂♂	5 ♀♀	,,	17.
Ctenocephalus canis	...	1♂		..	1.

During October 167 fleas were obtained:

Xenopsylla cheopis	...	58♂♂	41 ♀♀	total	99.
,, brasiliensis	...	37♂♂	31 ♀♀	,,	68.

November yielded 393 fleas:

Xenopsylla cheopis	...	156♂♂	129 ♀♀	total	285.
,, brasiliensis	...	63♂♂	45 ♀♀	,,	108.

Two hundred and twenty-eight fleas were got in December:

Xenopsylla cheopis	...	69♂♂	54 ♀♀	total	123.
,, brasiliensis	...	66♂♂	39 ♀♀	,,	105.

It will be seen that the males outnumber the females in every instance.

As regards the preponderance of X. cheopis over X. brasiliensis, it is greater during October and November which were the two worst months of human plague.

The fleas from Ebute Metta are treated separately as it was not an infected area. Only 38 fleas were obtained, all in December.

Xenopsylla cheopis	...	13♂♂	4 ♀♀	total	17.
,, brasiliensis	...	5♂♂	5 ♀♀	,,	10.
Ctenocephalus canis	...	8♂♂	3 ♀♀	,,	11.

It is not possible to give extensive figures as regards the number of fleas per rat.

Only fifteen live rats were obtained, all R. rattus and only six yielded fleas. The total from each was, 15, 14, 14, 12, 9 and 4 an average of just over eleven fleas per rat infested.

RODENTS AND PARASITES FROM OTHER TOWNS IN NIGERIA.

The data regarding rodents in other parts of Nigeria are scanty and scattered.

Fifty-two rats came from Warri, *Rattus rattus* 47 and *R. norvegicus* five.

Fifty-three rodents were sent from Lokoja, *R. rattus* 37, *R. norvegicus* 13, *Cricidura manni* 2 and *Cricetomys gambianus* one.

Thirty-two were obtained from Maidugari, *R. norvegicus* 16 and *R. rattus* four.

Twelve arrived from Jos, all *R. norvegicus*.

Ibadan provided seven, all *R. rattus*.

Fourteen fleas were obtained from Warri, *X. brasiliensis* 5♂♂ 9♀♀ and one *X. cheopis* ♂ from Lokoja.

LEPROSY.

Previous to the year 1915, the treatment of the inmates of the Yaba Leper Asylum was in the hands of the Medical Officer in charge. Chaulmoogra oil was in constant use from 1901 onwards. From 1909 until 1913, Deycke's Nastin preparations were given a fair trial with, however, very little real benefit.

In 1915, owing to a shortage of Medical Officers, the care of the lepers was entrusted to the Staff of the Medical Research Institute who had taken a keen interest in their progress since 1909, and this arrangement still holds.

During 1915, the late Dr. H. Sinclair Coghill made use of Salvarsan in a few cases but he obtained no evidence of the efficacy of this drug.

In 1916, he adopted Heiser's treatment, consisting in the injection intramuscularly of a mixture of Chaulmoogra and Camphorated oils along with Resorcin. The results were uniformly good and a full report was submitted to the Principal Medical Officer while a synopsis was printed in the "Annals of Tropical Medicines and Parasitology" Volume XI pages 205-212.

The favourable accounts of the action of Gynocardate of Soda in various publications of Sir Leonard Rogers in India, led to the adoption of this drug in 1917. The results were even better than those obtained by Heiser's method and there were the additional advantages that the dosage was small and that the intravenous route could be utilised.

Throughout 1918, Gynocardate continued in use but a proportion of the cases received also a course of Atoxyl. There was no appreciable difference in the results between the two groups. Full details are given in the Annual Reports of the Institute for 1917 and 1918.

In 1919, Nastin BI was given as well as Gynocardate, the former being given on the Friday and the latter on the Tuesday of each week. It was not obvious that Nastin had any beneficial effect. For the last three months of this year all treatment was suspended. Early in 1920, it was evident that an exacerbation of the disease had occurred in three patients and there was also one case in which treatment had failed to arrest the leprotic processes. These patients, therefore, were given a three months' course of Potassium Cuprocyanide as recommended by Sugai of Japan. There was not the slightest improvement in any case and at the patients' own request the use of the drug was stopped and Chaulmoogra oil by the mouth substituted.

The foregoing experience had led to the belief that Chaulmoogra oil contained constituents which had a specific action in Leprosy. Gynocardate was the first derivative to give satisfaction and when Moogrol was obtainable early in 1921, it was confidently anticipated that the results would be better. This anticipation has been realised and Moogrol has been the main stand-by in the treatment of Leprosy at Yaba, since that time.

During 1922, however, Harper's mixture of Moogrol, Ether and Iodine was given a six months' trial by Dr. W. A. Young. The results were apparently favourable, but the intravenous method of administration had to be changed to the intramuscular, and that, in turn to the oral. A gradually increasing dislike of the mixture finally led to its being discarded.

Oscol-Stibium was also used in several cases during 1922 but the results were not sufficiently encouraging to justify its continuance.

No other drug than Moogrol was tried in 1923, but early in 1924 Dr. Clive Sharp and Dr. H. Morrison experimented with Bismuth Cream intramuscularly. This latter mixture did not appear to offer any particular remedial effect.

The present belief is that Moogrol given intravenously is the best method of treating Leprosy at Yaba.

It has to be remembered that the type of the disease encountered is, for the most part, mixed, and that the cases are practically all well-marked and advanced at the time of admission. The first important point is therefore that the process of cure must of necessity be a protracted one. A method of treatment which does not irritate or depress either mentally or physically is consequently indicated. The second point is that large doses may bring about unpleasant or even dangerous reactions. It follows that small doses gradually increased to the point of efficacy are safest and at the same time not irritating. The third point is that intravenous injection causes no irritation and leaves none. The greatest practical difficulty in the treatment of Leprosy at Yaba has been to keep the patients contented and interested over the long period necessary for cure. Moogrol fulfils all the requirements. It is curative, and is so, in comparatively small doses. Provided the vein be entered and no leakage occur (this can be obviated by slow injection), no pain or induration ensue, and the drug need be given once a week or at most twice. An additional practical point of some interest is that the Nigerian native and particularly the Leper is singularly lacking in prominent superficial veins. The less frequently the few suitable vessels are punctured the less is the likelihood of their narrowing or occluding. It may be of interest to give the after history of the patients mentioned in the 1917 and 1918 reports and to add the details concerning subsequent admissions.

Case A. K. (Akoni) mentioned in 1917, 1918, 1920 and 1921 (is No. 5 of Dr. Coghill's report).

Male.—Admitted May, 1909. Age about forty-five years.

Duration of disease. "Since a boy."

Condition on admission.—"Main en griffe" and anæsthesia, left hand.

Left foot, all toes absorbed, anæsthesia.

Right foot, extensive ulceration on sole.

Nastin given at intervals September, 1909—December, 1913.

Condition thereafter, three small ulcers left sole, right foot healed.

Chaulmoogra oil by the mouth was given January, 1914—May, 1916.

Condition thereafter, anæsthesia on left arm and both legs.

Large ulcer left sole. Left ulnar and both peroneal nerves thickened.

Heiser's treatment May, 1916—June, 1917.

Condition thereafter, ulcer healed, only left foot anæsthetic.

Gynocardate of Soda one-tenth grain weekly, intravenously, increasing up to three grains, June, 1917—April, 1918, then Atoxyl half grain weekly increasing up to six grains, until September, 1918.

Condition thereafter, sensation complete, no further mutilation of digits, "Claw hands" remain, two small ulcers left sole. No further treatment except antiseptic dressings until 1920, when for the first three months Potassium Cuprocyanide was given, in 0.1 to 1% solution every ten days.

Condition thereafter, ulcers continue to come and go.

Moogrol at first intramuscularly then intravenously, the latter in weekly doses, 1c.c. increasing to 5c.c., August, 1921—April, 1922. Condition thereafter, ulcers healed. Disease apparently arrested. He died in 1923 of amœbic dysentery.

Case B. K. (Bakare). Mentioned in 1917 and 1918.

Male.—Admitted August, 1901. Age about forty-three years

Duration of illness, eighteen years.

Condition on admission.—Ulceration and deformity, toes of both feet.

Chaulmoogra oil given 1901-1909.

Condition thereafter, ulcers healing and re-appearing on hands and feet.

Nastin administered September, 1909—December, 1910 and July-November, 1911.

Condition thereafter, maculæ on trunk and ulcer on right foot.

Chaulmoogra oil given August-November, 1913.

Condition thereafter, maculæ faded and ulcer healed.

In 1916 there was anæsthesia on both arms and legs. Large ulcer on right sole. Both ulnar and both peroneal nerves thickened.

Heiser's treatment September-December, 1916.

Condition thereafter, ulcer healing, some return of sensation in right arm and both legs.

Gynocardate of Soda June, 1917—September, 1918.

Condition thereafter, some shortening of left fourth toe and of left index and ring fingers. Sensation unimpaired, ulcer healed. He has had no further treatment. Occasionally the ulcer on the right sole breaks down and heals again under antiseptic dressings. He farms his patch of land and is perfectly happy unless when treatment is suggested. There are no signs of active disease.

Case B. O. (Bolarinwa). Mentioned in 1917 and 1918. Erroneously labelled male in 1917 report.

Female.—Admitted February, 1912. Age about thirty-six years.

Duration of disease.—"Some years."

Condition on admission.—Mutilation of all digits. "Main en griffe" both hands. Ulcers on right big toe. Maculæ on trunk and arms.

Nastin given February, 1912—July, 1913.

Condition thereafter, ulcers on both feet, maculæ less prominent.

Chaulmoogra oil September, 1913—July, 1916.

Condition thereafter, ulcers healing and re-appearing. Impaired sensation, both hands.

Heiser's treatment September, 1916—June, 1917.

Condition thereafter, little alteration.

Gynocardate of Soda July, 1917—April, 1918.

Condition thereafter, no ulcers, no maculæ, fingers and toes all absorbed. No impairment of sensation.

She has received no further treatment, has shown no further signs of the disease and is cheerful and contented.

Case D. A. (David) of 1917, 1918, 1920 and 1921 (is No. 1 of Dr. Coghill's report).

Male.—Admitted February, 1912. Age about thirty-eight years.

Duration of disease. "Some years."

Condition on admission.—Leonine expression. Nodules and thickening of skin.

Nastin prescribed February, 1912—May, 1913.

Condition thereafter, nodules more numerous on face and ears.

Chaulmoogra oil October, 1913—May, 1916.

Condition thereafter.—Face leonine. Skin thickened. Many nodules on cheeks, brow, nose, lips and ears. Anæsthesia left forearm and thumb, right forearm, middle and ring fingers, and both legs from the knee downwards. Maculæ on hands and legs. Both feet and ankles œdematous.

Heiser's treatment May, 1916—May, 1917.

Condition thereafter.—Nodules diminished in size and number. Skin less thickened. Some of the maculæ disappeared. Some return of sensation.

Gynocardate of Soda May, 1917—September, 1918.

Condition thereafter.—Facies improved. No nodules. No ulcers. No maculæ. Right foot, toes "nibbled," nails gone. Left foot, all digits absorbed except stump of big toe. Right little finger angled. Sensation impaired in fingers and lower part of legs from just above the ankles. An iritis which had arisen earlier, had subsided.

No treatment 1919.

Condition thereafter, no further improvement. Eye trouble continues.

Potassium Cuprocyanide given first three months in 1920.

Condition thereafter, thinner, weaker and iritis chronic.

Moogrol given intramuscularly during 1921 until April, 1922.

Condition thereafter, gained in weight and improved in health but eye condition not arrested.

Harper's treatment April, 1922—September, 1922.

Condition thereafter, tubercles, maculæ, ulcers still absent, but patient now blind. Sodium Salicylate had no effect on the eye condition, nor had Mercury and Potassium Iodide.

Moogrol given intravenously October, 1923—December, 1924.

Condition thereafter, sensation practically unimpaired. Skin not wrinkled, no tubercles, no maculæ, no ulcers.

This patient has always been difficult to deal with.

Until he became blind he very frequently refused treatment, attributing all his pains and disabilities to the drug, not to the disease. Now, however, he is easily amenable, receives regular treatment and as a result the progress of the disease appears to definitely arrested.

Case L. A. (Lawani) of 1917, 1918, 1919, 1920 and 1921 (is No. 2 in Dr. Coghill's report).

Male.—Admitted November, 1911. Age about twenty-one years.

Duration of disease, four months.

Condition on admission.—Nodules on face and forehead. Maculæ on trunk.

Nastin given November, 1911—December, 1913.

Condition thereafter.—Nodules almost entirely disappeared, only a few maculæ remain.

Chaulmoogra oil January, 1914—May, 1916.

Condition thereafter.—Leonine expression.

Nodules on ears, cheeks, chin, lips and forehead.

Anæsthesia of both arms from elbow downwards, and of both legs from half-way below the knees downwards.

Both ulnar and peroneal nerves thickened. Numerous maculæ. Both feet and ankles œdematous.

Heiser's treatment May, 1916—June, 1917.

Condition thereafter.—Leonine expression less marked.

Maculæ gone. Nodules less prominent and less numerous.

Areas of anæsthesia less.

Gynocardate of Soda June, 1917—September, 1918.

Condition thereafter.—No œdema. Sensation complete. Few small tubercles re-appeared on chin, lips, nose and brow. Swelling of right index finger, and absorption of left little toe.

Gynocardate and Nastin January, 1919—April, 1919.

Condition thereafter, "no noticeable change."

By the end of 1919, however, the nodular condition of the face was again well-marked, there was œdema of both feet, the terminal phalanx of both index fingers was swollen, and there was "nibbling" of all the toes. There were three small ulcers on the right leg.

Potassium Cuprocyanide January-March, 1920.

Condition thereafter, no improvement.

Moogrol August, 1921—April, 1922, up to 6c.c. weekly, intramuscularly.

Condition thereafter, steady improvement.

Harper's treatment April-September, 1922.

Condition thereafter, continued to improve.

This patient left, of his own accord, early in 1923. There were no signs of active disease, but B. lepræ were present in the posterior nares.

Case S. H. (Shodeinde). Mentioned in 1917 and 1918 is No. 3 of Dr. Coghill's report.

Male.—Admitted September, 1905. Age about forty years.

Duration of disease about thirteen years.

Condition on admission.—Several maculæ.

Anæsthesia, right arm and leg.

Mutilation of all digits.

Ulcers on right hand and right foot.

Nastin, December, 1910—July, 1913.

Condition thereafter, maculæ disappeared.

Chaulmoogra oil October, 1913—May, 1916.

Condition thereafter.—Anæsthesia both arms from elbow downwards and both legs from knees downwards. Both popliteal and both ulnar nerves thickened.

Numerous maculæ.

Heiser's treatment May, 1916—June, 1917.

Condition thereafter.—Only a few maculæ remain on abdomen. Some return of sensation particularly in left arm.

Gynocardate June, 1917—September, 1918.

Condition thereafter.—Complete return of sensation. No maculæ, no ulcers. Both little toes shortened.

He received no further treatment and showed no signs of active disease. He died of broncho-pneumonia in 1924.

Case O. G. (Ogundipe). Mentioned in 1917, 1918 and 1919.

Male.—Admitted May, 1909. Age about thirty years.

Duration of disease, twelve years.

Condition on admission.—Maculæ on trunk.

Active mutilation of digits.

Nastin given July, 1911—July, 1913.

Condition thereafter.—Maculæ still present.

Ulceration of fingers and toes.

Chaulmoogra oil July, 1913—December, 1916.

Condition thereafter.—Maculæ on face, head and neck.

Anæsthesia both arms from elbow downwards and both legs from below the knee, downwards.

Considerable deformity of all digits.

Ulcers on left forearm and right leg.

Heiser's treatment January, 1917—July, 1917.

Condition thereafter.—Ulcers tending to heal. Maculæ fainter.

Gynocardate of Soda July, 1917—September, 1918.

Condition thereafter.—Maculæ smaller and fainter.

Small ulcer base of right second toe.

Impaired sensation left foot and lower third of right leg.

Gynocardate and Nastin January-April, 1919.

Condition thereafter.—Maculæ disappeared.

Ulcer healed.

Some impairment of sensation on right leg.

This patient adjudged himself cured and left the Asylum without permission early in 1920.

Case O. M. (Omulu). Mentioned in 1917 and 1918 and is No. 7 in Dr. Coghill's report.

Female.—Admitted August, 1897. Age about forty years.

Duration of disease, four years.

Condition on admission.—Maculæ on both arms.

Pain and swelling, left foot.

No treatment for five years.

Condition thereafter, ulceration and absorption of digits.

Chaulmoogra oil 1902-1910.

Condition thereafter, all digits mutilated.

Nastin given December, 1910—August, 1912.

Condition thereafter, all digits mutilated. Large ulcer, left sole.

Chaulmoogra oil 1913-1916.

Condition thereafter.—Anæsthesia both arms and left leg.

Both ulnar nerves thickened.

Maculæ on upper arms.

Two large ulcers, left sole.

Heiser's treatment September, 1916—June, 1917.

Condition thereafter.—One of the ulcers on left sole healed.

Anæsthesia confined to hands and left leg,
from below the knee downwards.

Gynocardate of Soda June, 1917—April, 1918, and Atoxyl April-May, 1918.

Condition thereafter.—Anæsthesia, left leg from knee downwards.

No maculæ.

Small ulcer left sole.

No further treatment was given and early in 1919 the ulcer healed. Sensation was unimpaired. Not a single finger or toe remained. From 1920 onwards no fresh signs of disease appeared. The patient died of pneumonia in June, 1924.

Case P. A. (Paul). Mentioned in 1917 and 1918.

Male.—Admitted June, 1903. Age about twenty-nine years.

Duration of disease, ten years.

Condition on admission.—Opacity of cornea, both eyes.

Ulcers on cheeks.

Right third and left second toes
absorbed.

Chaulmoogra oil 1903-1910.

Condition thereafter.—All digits mutilated. Anæsthesia both arms from elbows and both legs from knees downwards.

Totally blind. Ulcer on right foot.

Nastin 1910-1913, along with Chaulmoogra oil.

Condition thereafter.—Anæsthesia limited to hands and feet.

No treatment until 1916.

No ulcers.

Condition thereafter.—Anæsthesia left shoulder, forearm and hand, right hand, and both legs from middle of thigh downwards. Both ulnar nerves thickened. Maculæ on chest and back.

Heiser's treatment May, 1916—July, 1917.

Condition thereafter.—Some return of sensation particularly on left arm. Maculæ fading.

Gynocardate of Soda July, 1917—April, 1918 then Atoxyl April-September, 1918.

Condition thereafter.—Some further absorption of digits.

Impaired sensation both hands and feet.

No maculæ, no ulcers, no apparent nerve thickening.

This patient has received no further treatment unless for an occasional and infrequent course of Chaulmoogra oil. There are, to-day, no signs of active disease, nor have there been any during the last six years.

Case I. S. (Ishegbere). Mentioned in 1917 and 1918.

Male.—Admitted January 1915. Age about forty-five years.

Duration of disease sixteen years.

Condition on admission.—Blind in right eye. Numerous maculæ. Mutilation of toes.

Gynocardate of Soda August, 1917—April, 1918.

Condition thereafter.—No further mutilation. No ulcers. No maculæ, no impairment of sensation.

No further treatment was given and the patient remained well. He left of his own accord in 1923.

Case A. D (Aduviere or Oduyere). Mentioned in 1917.

Male.—Admitted August, 1912. Age about forty years.

Duration of disease, twelve years.

Condition on admission.—Leonine countenance.

Considerable mutilation of toes.

No record of treatment until 1917, during which time, ulcers developed on both heels and the left arm became swollen.

Gynocardate of Soda July-December, 1917.

Condition thereafter.—Ulcers healed, left arm normal, no further mutilation, no anæsthesia, no B. lepræ in posterior nares.

No further treatment was given and no recurrence of the disease took place.

He was discharged in 1920.

Case L. M. (Lamina). Mentioned in 1917 and 1918.

Male —Admitted July, 1911. Age about thirty-five years.

Duration of disease, one year.

Condition on admission.—Leonine countenance.

Maculæ on trunk.

There is no record of treatment until 1917 although he was probably given Chaulmoogra oil at intervals. During that time the maculæ increased in number.

Gynocardate of Soda August, 1917—April, 1918, Atoxyl April-September, 1910.

Condition thereafter.—Maculæ disappeared. Face normal looking.

There has been no recrudescence and the patient at the present date appears to be well.

Case O. S. (Oshunmuyiwa). Mentioned in 1917 and 1918.

Male.—Admitted July, 1917. Age about fifty years.

Duration of disease, fifteen years.

Condition on admission.—“ Main en griffe ” both hands.

Maculæ on chest. Considerable mutilation of all digits.

Ulcers on left hand and right foot.

Anæsthesia, forearms, hands and feet.

Gynocardate of Soda August, 1917—April, 1918, Atoxyl April-September, 1918.

Condition thereafter.—Sensation practically complete.

Maculæ disappeared. No further mutilation of digits and “ claw-hand ” condition less marked. Ulcers healed.

This patient received no further treatment, and active signs of disease did not re-appear.

He died in 1921 of acute amœbic dysentery.

Case O. D. (Odeyemi). Mentioned in 1917.

Male.—Admitted August, 1916. Age about forty years.

Duration of disease sixteen years.

Condition on admission.—Deformity of all digits.

Anæsthesia left arm from elbow downwards.

Gynocardate of Soda July-December, 1917.

Condition thereafter.—Sensation returned. No further mutilation of digits. No B. lepræ in smear from posterior nares.

This patient left early in 1918 without permission.

Case A. E. (Akoni). Mentioned in 1917 and 1918.

Male.—Admitted May, 1916. Age about thirty-seven years.

Duration of disease ten years.

Condition on admission.—Mutilation of toes.

Ulcers on both feet.

Gynocardate of Soda August, 1917—September, 1918.

Condition thereafter.—Ulcers healed. No further mutilation of toes.

This patient was discharged in 1920 showing no active signs of the disease.

Case C. A. (Calabar). Mentioned in 1917, 1918, 1919, 1920, 1921 and 1922.

Male.—Admitted December, 1916. Age about thirty-five years.

Duration of disease six months.

Condition on admission.—Face leonine. Nodules on both ears.
Maculæ on trunk. Abundant *B. lepræ*
in posterior nares.

Heiser's treatment January-July, 1917.

Condition thereafter.—Disease progressing, tubercles larger and maculæ more numerous.

Gynocardate of Soda July, 1917—April, 1918, Atoxyl May-September, 1918.

Condition thereafter.—Maculæ disappeared. Tubercles more numerous, left second toe nibbled. Hands and feet swollen. Tingling pains in limbs.

Gynocardate and Nastin B.I. January-April, 1919.

Condition thereafter.—Leonine countenance pronounced, nodular condition of chin, lips, cheeks, nose, ears and forehead advanced, skin generally thickened, a small ulcer on tip of left great toe, shooting pains in limbs.

Potassium Cuprocyanide January-March, 1920.

Condition thereafter.—No improvement.

Moogrol August, 1921—April, 1922.

Condition thereafter.—Nodules less prominent and less numerous.
Pains in limbs infrequent.
Conjunctivities present.

Harper's treatment April-September, 1922.

Nodules continue to be less prominent.

Swelling of feet and hands persists, and there is thickening of phalanges.

Moogrol May, 1923—December, 1924.

Condition thereafter.—Tubercular condition of face greatly improved leonine facies barely noticeable.
Still some conjunctivities.
No maculæ. No impairment of sensation.
Hands and feet still swollen but not oedematous, mainly due to skin thickening.
Swelling of fingers less prominent. Ulcer dorsum right foot. No mutilation of digits, but all toe-nails "nibbled."

The disease in this patient resisted all treatment although it must be stated that there were broken periods when from one cause or another no drugs were given. Latterly, however, there has been distinct evidence of improvement.

The acute and extensive nature of the lesions in the course of the illness suggest a medicinal rather than a natural cause of the amelioration.

The remaining cases have not been previously described.

Idowu.—Age about twenty-seven years. Male.

Admitted 29th January, 1920. Duration of disease four months.

Condition on admission.—Irregular rounded patches with slightly raised edges on back, chest and abdomen.

Smaller patches on ears nose and chin. No anæsthesia. No B. lepræ in posterior nares.

Refused treatment.

By February, 1922, small nodules had appeared on cheeks and ears.

Oscol Stibium given February-April, 1922 and Harper's treatment April-September, 1922.

Condition thereafter.—No arrest of disease.

Moogrol intravenously May, 1923—April, 1924, Bismuth paste April-June, 1924 and Moogrol intravenously June-December, 1924.

Condition thereafter.—Nodules less numerous and have decreased in size on cheeks and ears. No ulcers, no affection of digits, no anæsthesia, no maculæ.

This disease is obviously being held in check and with regular treatment patient should do well. He is, however, always ready with an excuse to escape his injection.

Todonu.—Age about twenty-seven years. Male.

Admitted 11th November, 1920. Duration of disease, three years.

Condition on admission.—Maculæ on face, particularly the brow and the left cheek, all anæsthetic.

Treatment was not accepted until September, 1923 by which time macules had also appeared on the shoulders, trunk and thighs.

Moogrol intravenously September, 1923—April, 1924.

Thereafter treatment refused.

Condition.—Macules faded. No anæsthesia.

Ibrahim (Brimah). Age about forty years. Male.

Admitted 22nd December, 1920. Duration of disease, six months.

Condition on admission.—Small tubercles on forehead and nose. Maculæ on trunk and limbs, anæsthetic.

Refused treatment until 1922.

Oscol-Stibium given January-April, 1922 and Harper's treatment April-September, 1922.

Condition thereafter.—Maculæ fainter. Nodules more numerous.

Refused treatment until 1923 by which time the face had become highly tuberculated, nodules had appeared on arms and legs, skin of hands and feet thickened and slightly impaired sensation there moogrol intravenously May, 1923—April, 1924, Bismuth paste May-June, 1924 and Moogrol June-December, 1924.

Present condition.—The nodules are smaller and softer, there are no maculæ, no ulcers, and sensation is unimpaired.

The outlook is believed to be hopeful as the patient willingly takes up to 8cc Moogrol intravenously once a week.

Musa. Age about thirty-five years. Male.

Admitted 16th April, 1923. Duration of disease, six months.

Condition on admission.—Maculæ on chest, shoulders, upper arm and back, all anæsthetic. A few small tubercles on ears.

Moogrol June, 1923—April, 1924.

Condition thereafter.—Maculæ disappeared, and tubercles less prominent.

This patient decamped later in the year.

Patience Smith. Age about fifty years. Female.

Admitted 5th April, 1923. Duration of disease, twenty-four years.

Condition on admission.—Some corneal capacity, both eyes.

Nodules on both ears. Fingers and toes mutilated. Ulcers on several fingers and toes.

This woman refused treatment until November, 1924, by which time all the fingers of both hands had lost the distal phalanx, the thumb in each hand being ulcerated at the tip. The great and second toe of the right foot were ulcerated at the tip, the other toes were mere stumps. The great and the last toe in the left foot were stumps and the other toes were ulcerated at the tips.

No areas of anæsthesia were found.

The ears still showed a few tubercles. There were a few maculæ on the trunk.

Moogrol November-December, 1924.

Condition thereafter.—Ulceration at tips of digits considerably less. Maculæ fading.

Aina. Age about forty years. Female.

Admitted 12th November, 1923. Duration of disease, seven years.

Condition on admission.—Maculæ of different sizes on trunk, limbs and face, anæsthetic. Small ulcer left ankle. Thumb, fore and ring finger right hand, distal phalanx absorbed, middle finger minus distal and middle phalanges, little finger angled. Thumb, middle, ring and little finger angled, left hand, proximal phalanx fore-finger thickened.

Right foot, big toe absent, ulcer at site. Other toes ulcerated at tips. Left foot, digits intact.

Moogrol November, 1923—April, 1924, Bismuth paste April-June, 1924, Moogrol June-December, 1924.

Condition thereafter.—Many maculæ disappeared, all others fading.

Ulcer healed. Tips of digits clean. No further mutilation.

Mustafa. Age about thirty-five years. Male.

Admitted 11th January, 1924. Duration of disease, nine years.

Condition on admission.—Numerous maculæ on trunk, limbs and face, not all anæsthetic. Second toe of right foot absent. Whole foot thickened, two ulcers near great toe. Left foot and both hands, not mutilated. Impaired sensation, hands and feet.

Moogrol January-April, 1924, further treatment refused.

Condition thereafter.—Maculæ fewer and fainter. No ulceration.

Oyekan. Age about fifty years. Male.

Admitted 15th April, 1924. Duration of disease unknown.

Condition on admission.—Maculæ on face and limbs, anæsthetic. Fore finger, left hand angled. All other digits intact.

Bismuth paste April-June, 1924, Moogrol intramuscularly June-August, 1924.

Condition thereafter.—Maculæ gone. Ulcer on right thumb and on dorsum of right foot. All digits "nibbled."

Moogrol intravenously November-December, 1924.

Condition thereafter.—Ulcers healed, and tips of digits cleaning.

Ogunbiye. Age about fifty years. Male.

Admitted 22nd July, 1924. Duration of disease, eight years.

Condition on admission.—Tubercles on ears. Maculæ on face, trunk and limbs, anæsthetic. Ring, and little finger left hand angled. Ulcer on left great toe and left ankle.

Chaulmoogra oil July-November, 1924.

Condition thereafter.—Ulcers healed. Thickening of all fingers. "Nibbling" of toes. Some tubercles on arms and ears. Maculæ faint.

Moogrol November-December, 1924.

Condition thereafter.—No ulcers. No maculæ. Thickening of fingers less prominent. Tips of toes cleaning. Tubercles decreasing in size. Some impairment of sensation in both lower limbs.

CONCLUSIONS.

Details have been given of a number of cases of leprosy in which apparent cure or considerable improvement has taken place under treatment with Chaulmoogra oil either in combination or by one of its derivatives.

The cases have been, for the most part, of long standing and treatment has had to be carried on over a long period of time. Considerable patience and tact are necessary with the Nigerian leper and reasons have been given to show that Moogrol is a suitable drug, good food, suitable housing, plenty of sunlight and cleanliness being necessary adjuncts.

BLACKWATER FEVER.

Reports have been received regarding fourteen cases of this disease. Other cases occurred.

A resume is given of the details gathered from the reports.

Sex.—All the patients were males.

Occupation.—Officials numbered eight, two in the Public Works Department, two in the West African Frontier Force and one case each in the Political, the Railway, the Marine and the Survey Departments. Of the six non-officials, five were engaged in commerce and one in mining.

Nationality.—Twelve were British and two were Swiss.

Age.—The age ranged from 22 to 49 years, the actual figures being 22, 27, 28 (two), 29, 31, 36, 37, 44, 45 (two), 47, 48 and 49 years.

Locality.—Ten cases occurred in the Northern Provinces, Kano three cases, Kaduna two cases and Ankpa, Jos, Keffi, Offa and Ropp one case each. Four cases arose in the Southern Provinces, one each in Ikot-Ekpene, Oshogbo, Port Harcourt and Umuahia.

Season.—There were three cases in January one in February, two in April, one in May, one in June, three in August, two in November and one in December.

Mortality.—The deaths numbered eight, five of which occurred in patients aged over forty years.

In the following paragraphs, the length, of tropical residence, the occurrence of previous attacks of Malaria, and the habits as regards the use of Quinine in prophylaxis are considered together for each case, these three factors being of importance in the etiology of Blackwater Fever.

Case 1.—Second tour in Nigeria. Present tour nine months in duration. First arrived two and a half years ago. Took five grains Quinine daily in tabloid form. On four or five occasions has had an evening rise of temperature. The Medical Officer adds that patient had very irregular hours.

Case 2.—Fifth tour in Nigeria. Present tour nine months in duration. First arrived nearly ten years ago. "He brings out three bottles of Quinine Bihydrochloride every tour and averages one tabloid a day, but takes more if tired." Has five or six "goes" of malaria every tour.

Case 3.—Third tour in Nigeria. Present tour seven and a half months in duration. First arrived three and a half years ago. Took five grains Quinine Bisulphate in solution, daily after breakfast. He has been seven times admitted to Hospital for Malaria in three and a half years. Sub-tertian parasites were found in the blood three days before the onset of Blackwater.

Case 4.—First tour in Nigeria, one and a half years in duration. This is his only experience of the tropics. He did not take Quinine regularly. He has had six attacks of fever. Previous to the onset of Blackwater he had taken no Quinine for a fortnight after "recovering" from a definite attack of malaria.

Case 5.—Third tour in Nigeria. Present tour nineteen months in duration. First arrived four and a half years ago. Did not take Quinine regularly. Had an attack of malarial fever four weeks prior to the onset of Blackwater.

Case 6.—First tour in Nigeria, eighteen months in duration. ("Had been previously in the tropics"). Did not take Quinine regularly ("if at all"), and had taken none recently. Had suffered from frequent attacks of malaria and had twice been admitted to Hospital for that complaint.

Case 7.—First tour in Nigeria, fifteen months in duration. Had been seven years in Senegal where he had malaria, and twelve years in Shanghai. Took Quinine five grains daily only during the wet season. (He was stationed in Kano where the rainy season is a short one).

Case 8.—Eighth tour in Nigeria. Present tour seven months in duration. First arrived twelve years ago. Previous tropical experience included two years in India, and five years in the Gold Coast where he had an attack of Blackwater Fever. Took Quinine irregularly and had Malaria several times.

Case 9.—Seventh tour in Nigeria. Present tour five months in duration. First arrived ten years ago. Had spent eight years in "South America." Took Quinine Bisulphate, in tabloid form, grains five "only when seedy." "Has had very poor health this tour," with many "small touches" of fever, and was off duty six days with Malaria.

Case 10.—Second tour in Nigeria. Present tour twenty-one months. First arrived three years ago. States he took five grains Quinine daily. “There is reason to believe that he did not take Quinine regularly, despite his statements to the contrary.” Had an attack of malaria three days before onset of Blackwater.

Case 11.—Second tour in Nigeria. Present tour five years in duration. First arrived eight years ago. He took no Quinine except during attacks of fever. Had several attacks of Malaria. Was in very straitened circumstances.

Case 12.—Third tour in Nigeria. Present tour nine months in duration. First arrived four years ago. For one year previous to arrival had been in Asia Minor. Took Quinine irregularly. Had several attacks of Malaria.

Case 13.—Second tour in Nigeria. Present tour two years in duration. First arrived three years ago. Had been in Straits Settlements and in Siam for two years. Took five grains Quinine daily when attacks of fever were on. Had numerous slight attacks of Malaria.

Case 14.—First tour in Nigeria twelve months in duration. Had been one year in Persia and Mesopotamia. Took a five-grain tabloid of Quinine regularly at lunch time each day. “Has been constantly on the sick-list with Malaria,” “low fever” and gastritis.

A study of the factors enumerated above shows that all the patients were exposed for a sufficiently long period to the risk of contracting not only one but several malarial attacks.

In actual fact all the patients suffered from one or more attacks of Malaria or of “fever” or “evening rise of temperature.”

Only four patients laid claim to taking five grains of Quinine daily. The first of these lived very irregular hours; the second contracted seven definite attacks of Malaria in three and a half years; the third obtained no credence from the Medical Officer in his statement, and the fourth had been constantly on the sick-list with Malaria and gastritis.

The main indication, prominently standing out, in all fourteen cases is carelessness. Carelessness as regards the efficient cure of a malaria attack and carelessness as regards the prevention of infection, not only by the use of Quinine but by the use of mosquito-boots and the avoidance of late nights in the open. Records of cases of Blackwater Fever in Nigeria have been kept for over twelve years. They contain no instance of the occurrence of the illness in a person who avoided these mistakes.

The possible action of Quinine as an excitant or precipitant of the hæmolytic condition can be gathered from the following Table (Table VII). (See page 32).

The total amount of Quinine taken was twenty grains or more, within twenty-four hours, in three cases; it was ten grains in six cases and in the remaining five the total amount in twenty-four hours was five grains. Ten grains was the largest single dose taken by the mouth in any case excepting case (3) in which a single dose of twenty grains was given in an enema in addition to ten grains by the mouth. Ten grain doses were taken in seven cases (including case 3) and five grain doses in the remaining seven. In no case did the total amount of Quinine taken in twenty-four hours exceed twenty grains, so that it cannot be said that overdoses of the drug were responsible for precipitating the attack of Blackwater.

As regards the period of time elapsing between the taking of the last dose of Quinine and the appearance of hæmoglobin in the urine the figures are given in the last column of the table. In no case was the interval longer than twelve hours, this being approximately the time in six cases. It was six hours in four cases and four hours or less in the remaining four cases.

TABLE VII.

Case.	Salt.	Form.	Mode.	Dosage.	Total Quinine.	Interval.
1	Hydrochloride	Tablet	Mouth	5 grains thrice on day before onset	...	...
	"	"	"	5 grains four times on day of onset	...	...
2	Bihydrochloride	"	"	10 grains 8 hours before and 10 grains 4 hours after onset	...	...
3	Hydrochloride	Solution	Intramuscular Enema	7 grains three days before onset	...	...
	"	"	"	20 grains twice 2 days before onset and 20 grains on day of onset	...	...
	"	"	Mouth	10 grains thrice on day before onset	...	...
4	?	Tablet	"	10 grains twice on day onset	...	...
5	?	?	"	10 grains on night before onset	...	...
6	Hydrochloride	?	"	10 grains on day of onset	...	...
7	?	Tablet	"	15 grains day before onset, 10 grains on day of onset	...	...
8	Hydrochloride	Solution	Intramuscular	10 grains on day of onset	...	...
9	"	"	Mouth	10 grains on day of onset	...	...
10	"	Tablet	"	5 grains daily	...	...
11	?	?	"	5 grains day of onset	...	...
12	?	Solution	"	5 grains day of onset	...	...
13	Hydrochloride	?	"	5 grains night before onset	...	...
14	?	Tablet	"	5 grains night before onset	...	...

{ 35 grains in 48 hours

10 grains in 24 hours

{ 97 grains in 72 hours

Last dose at onset.
12 hours.

6 "

3 "

3 "

6 "

12 "

12 "

6 "

12 "

12 "

5 grains in 24 hours

5 grains in 24 hours

5 grains in 24 hours

The following short history of the illness in thirteen cases indicates the malarial nature of the attack and the difficulty of forecasting the onset of the black-water stage.

Case 1.—Had “some fever” and was off colour for two days before onset of hæmoglobinuria. There was no rigor. Vomiting occurred once. The initial hæmoglobinuria almost cleared in twenty-four hours but there was a slight remission on the second day and another on the third day. The temperature reached 102.4°F on the first day, was normal on the second, rose to 100.8°F on the morning of the third day, regained normal in the evening, and remained so.

Case 2.—There was fever and evening fatigue for three or four days before onset. Rigor, vomiting and diarrhœa immediately preceded the appearance of black-water. Jaundice appeared on the first day and vomiting continued. The liver and spleen were both greatly enlarged. The urine cleared steadily in fifty-five hours. The highest temperatures were, 104.6°F on first day, 101.6°F on second day, 104.6°F on third day, 101.4°F on fourth day, 100.4°F on fifth day and thereafter normal.

Case 3.—An attack of sub-tertian malaria (parasites found) preceded the hæmoglobinuria by three days. There were pains in loins and hips just before onset but there was no rigor until the second day of hæmoglobinuria, on which day also, jaundice was noticed. There was little vomiting, and no diarrhœa. Highest temperature 102°F on first day, 105°F on second, 102.6° on third and 102°F on fourth. Patient died from syncope on fourth day, hæmoglobinuria having persisted.

Case 4.—Had an attack of fever a fortnight previously and had passed dark urine on one occasion during it. On evening before present illness was feeling fit and went out riding. Next morning was feverish, had a rigor, vomited, and two hours later passed black water. Jaundice appeared on first day, there was frontal headache, slight vomiting occurred and the spleen was enlarged and tender. On the second day, there was pain over the supra-pubic region, headache persisted and there was delirium in the evening. Third day, vomiting was severe, air-hunger and dyspnœa developed, and death took place from syncope in the afternoon. Temperature first day 105°F, second day 106.4°F, third day 105°F. Hæmoglobinuria persisted.

Case 5.—Had an attack of fever four weeks previously and passed red urine. During the interval felt well but on evening previous to onset was out of sorts. He had a rigor during the night and shortly afterwards passed black water. There was frontal headache and epigastric tenderness. The spleen was palpable. The urine cleared during the first day but darkened in the evening again after another rigor. Cleared entirely next morning. Temperature on second day 103°F, on third day 99.8°F.

Case 6.—Felt “feverish” for two days prior to onset of hæmoglobinuria. There was severe headache. A violent rigor occurred, with vomiting and diarrhœa and shortly afterwards dark urine was voided. Jaundice and bodily pains developed on first day and nausea with vomiting were continuous. Enlargement of liver but not of spleen. No improvement took place until the sixth day when the urine began to clear. It was red again on the seventh day but cleared up on the eighth day. Hiccough now developed and the urine became scanty. Between the eighth and fourteenth day the highest daily amount of urine passed was 2½ ounces. The temperature fell from 103°F on the first day to normal on the second, and remained so. Death occurred on the fourteenth day from suppression of urine.

Case 7.—Had been feeling “feverish” for two days before the actual appearance of hæmoglobinuria. Had a rigor in the early morning and eight hours later observed that his urine was dark red in colour. Jaundice developed during the first day. Vomiting nausea and diarrhœa were absent. Both liver and spleen were slightly enlarged. The urine cleared up on the second day. The temperature fell from 102°F on the first day to normal on the second day.

Case 8.—He went to bed on the previous day with a more than usually severe attack of “fever.” He was admitted to Hospital, distressed with vomiting and the same evening passed black water, having had a rigor seven hours before. Jaundice was observed on the first day. There was pain and tenderness over an enlarged spleen and severe joint pains. Bilious vomiting was a prominent feature. The hæmoglobinuria cleared up on the fifth day. The temperature was 99.8°F on the first day, 104°F on the second and normal thereafter. Suppression of urine occurred and he died on the sixteenth day. Postmortem, it was found that the kidneys were of the “large white” type.

Case 9.—“Went sick” on previous day. temperature 100°F. Next morning temperature normal but spleen enlarged and liver tender on pressure. Had a severe rigor and shortly afterwards passed dark red urine. Jaundice was observed on the first day. There was some diarrhœa and slight vomiting. Hæmoglobinuria lasted three days and then anuria set in. The highest temperature on the first day was 104°F, on the second 102.4°F, on the third and fourth days 101°F. Thereafter it was round about 99°F until death on the eighth day from suppression of urine.

Case 10.—Felt “feverish” on 19th August. Attack of vomiting during night of twenty-first. On morning of twenty-second, he passed black-water. Jaundice appeared on the first day. Liver and spleen enlarged. Bilious vomiting and diarrhœa occurred. Temperature at no time exceeded 100.6°F. Excretion of urine became very scanty. Death occurred on sixth day, from suppression of urine.

Case 11.—Treated himself for “fever” on thirteenth, fourteenth and fifteenth August. In early morning of sixteenth had a rigor and four hours later passed black water. The “self-treatment” consisted of five grains Quinine daily. Jaundice appeared on seventeenth. On eighteenth August, suppression of urine began and he sought medical advice. He was at once taken to Hospital and he died six days later without having passed any urine during that period. The temperature ranged between 98° and 101.2°F whilst in Hospital.

Case 12.—Patient took an active part in some regimental sports during the week before his attack, although he was suffering from “fever.” general malaise and gastritis. On the evening of 17th November, he sought admission to Hospital and was given five grains of Quinine in liquid form. Three hours later he had a rigor and shortly afterwards he passed black water. Jaundice appeared within twelve hours. The spleen was enlarged and there was tenderness over the liver. Diarrhœa was present for the first few days. He had two relapses during his stay of two months in Hospital. For the first five days the temperature ranged between 101.8°F and 104.4°F. He had a rigor again on the second day, and another on the fourth day. On the sixth day the temperature became normal and the urine was clear on the seventh day. On the eleventh day, during a rigor the temperature shot up to 104.6°F and on the following morning the urine was dark-red in colour. The urine cleared in four days but an irregular febrile temperature was charted until the twenty-third day when, after a rigor, 104.8°F was recorded, the urine again becoming red. It cleared,

however, on the following day, and convalescence followed. Throughout the entire illness vomiting was frequent, at times, severe, and on more than one occasion brought about alarming collapse.

Case 13.—Patient had been in poor health for some time but the onset of the present illness was sudden, hæmoglobinuria being preceded by only a few hours of malaise, and heralded by a rigor. Jaundice was noticed on the second day. Vomiting was a marked feature of the illness. He died on the fifth day from cardiac failure. The temperature varied between 99.4°F and 102.6°F but was 103°F just before death.

No details of the illness are available in Case 14.

It will be observed that there was a fatal termination of the illness in eight cases, a mortality of over 57% in the fourteen cases. The actual cause of death was suppression of urine in five and syncope in three. Various factors in these fatal cases appear worthy of mention.

In the age-period twenty-one to thirty years there were five cases with two deaths. In the period thirty-one to forty years there were three cases with one death. In the period forty-one to fifty years, however, there were six cases with five deaths.

One patient was in his first tour which was of eighteen months duration. Attacks of malaria had been frequent, and he did not take Quinine prophylactically.

Three patients were in their second tour and two of these had served a total of three years. The present tour was twenty-one months in one and twenty-four months in the other. Both had suffered from malaria and neither took Quinine regularly as a prophylactic. The third patient had served altogether eight years, his present stay having been unbroken for five years. He suffered frequently from malaria, such occasions being the only ones on which he took Quinine.

One patient was in his third tour. His total residence was three-and-a-half years and his present tour was of seven months. He had numerous attacks of malaria and he was not in the habit of taking Quinine daily.

One patient had served five tours totalling ten years. The present tour was of nine months. He suffered frequently from malaria, and he stated that he took five grains Quinine Bisulphate in solution daily after breakfast.

One patient was serving his seventh tour of which five months had elapsed. His total residence in Nigeria was ten years. He had frequent attacks of malaria and these were the only occasions when he used Quinine.

The eighth fatal case occurred in a patient who was in his eighth tour. He had served twelve years altogether and had reached the seventh month of his present tour. He had previous service in the Gold Coast and in India, in the former of which countries, some fourteen years ago, he had suffered from one attack of Blackwater fever. He was not a regular taker of Quinine and he had frequent attacks of malaria.

Remissions or relapses were observed in a few cases.

There were remissions in Cases (1), (5) and (6). In Case (1) the urine became nearly clear on the second day, darkened in the evening, nearly cleared again on the third day, darkened once more in the evening and cleared entirely on fourth day.

In case (5) there was only one remission, a slight one at the end of the first day of hæmoglobinuria but the urine was clear on the following morning.

In case (6) there was a remission on the seventh day and the urine cleared on the eighth.

Relapse occurred in one case only, No. 12. The urine cleared on the seventh day of illness. A relapse occurred on the eleventh day hæmoglobinuria persisting for four days. A second relapse occurred on the twenty-third day, but the urine cleared again in twenty-four hours.

No information is available regarding Case (14).

The duration of hæmoglobinuria in the cases which recovered was thirty-six hours in two cases, fifty-five hours in one, seventy-two hours in one and two hundred and fifty-two hours in one. This last included two relapses.

In the fatal cases the duration of hæmoglobinuria was forty-eight hours, fifty hours, seventy-two hours (two cases) ninety-six hours, one hundred and eight hours, one hundred and twelve hours and one hundred and seventy hours.

A previous attack of Blackwater fever had occurred certainly in Case (8) fourteen years previously and doubtfully both in Case (4) two weeks previously and Case (5) four weeks previously.

Blood smears from five cases were kindly sent to the Medical Research Institute. In no instance were malaria parasites found but in one (Case 2) pigmented mononuclear cells were seen. The differential leucocyte count and the Arneth count can be seen in the accompanying Table. (See page 37, Table VIII).



TABLE VIII.

Case.	Day.	P.	S.	L.	M.	E.	T.	Ma.	My.	Ery.	Vac.	Nor.	Meg.	Pa.	Pg.	I.	II.	III.	IV.	V.
1	3rd ...	69.6	7.4	2.4	18.6	...	1.6	0.2	0.2	...	...	9	...	...	...	58.8	33.2	7.6	0.4	...
	4th ...	69.8	8.8	2.2	15.6	...	2.8	0.8	...	...	1	16	5	...	...	46	35.6	16.2	2.2	...
	5th ...	73	6	2.2	15.8	1.2	1.6	0.2	...	...	1	9	2	...	...	36	38.8	22.8	2	0.4
	6th ...	71.6	7.8	2.6	14.8	1.6	0.8	0.4	0.4	...	6	5	1	...	...	31.2	36.4	26.8	4.4	1.2
2	2nd ...	54.8	8.6	4	26.8	1.4	3.8	0.6	...	...	5	...	...	...	...	80.4	17.2	2.4	...	...
	3rd ...	49.6	17	4.2	23.4	0.4	4.2	0.6	0.6	2	6	1	...	...	...	74.4	22	3.6	...	...
	4th ...	51.8	21.2	3.4	19.2	...	2.8	0.4	1.2	...	2	2	...	...	...	67.2	26.8	5.6	0.4	...
	5th ...	48	16.8	3.4	24.6	3	2.8	0.8	0.6	...	...	...	...	...	...	63.2	27.2	9.6	...	...
4	3rd ...	54.2	27.4	4.4	11.6	...	2	...	0.4	2	...	...	1	...	...	60.4	32.6	7	...	...
9	3rd ...	52.8	18.8	6.2	22.2	...	...	...	...	3	5	...	...	...	...	55.6	33.2	10.4	0.8	...
11	4th ...	84	6	1.6	6.2	...	1.8	...	0.4	...	...	...	...	...	...	37.6	35.6	22.4	3.6	0.8

P=Polymorph neutrophil. S=Small lymphocyte. L=Large lymphocyte. M=Large Mononuclear. E=Eosinophil. T=Transitional. Ma=Mast cell. My=Myeolocyte.
Ery=Erythrophone. Vac=Vacuolated mononuclear cell. Nor=Normoblast. Meg=Megaloblast. Pa=Parasite. Pig=Pigment in mononuclear cell.
The Roman numerals refer to Arneeth's divisions,

Blood examinations made by the Medical Officer in charge of the case were as follows:—

Case (3).—Subtertian parasites found three days before onset of Hæmoglobinuria.

Case (5).—No parasites, second day.

Case (6).—No parasites, first day.

Case (7).—No parasites, first, second and third days.

Case (8).—No parasites, first, second, third, fourth, fifth and sixth days.

Case (10).—No parasites, second day.

Case (12).—No parasites, second day.

The following Medical Officers kindly sent records of cases:—

Dr. Adcock, Dr. Digby, Dr. Gaston, Dr. Glover, Dr. McKay, Dr. Morehead, Dr. Nolan, Dr. Stephens, Dr. Q. Stewart, Dr. Thomson, Dr. Waldron, and Dr. Watt.

ROUTINE CLINICAL WORK.

The following information, extracted and arranged from the Laboratory records mainly by Dr. H. Morrison, deals with the miscellaneous material sent to the Institute for examination and report. It is additional to the work done at the Clinical Laboratory attached to the Colonial Hospital in Lagos and many of the specimens came from different parts of the Colony.

Blood Smears.—Films from 359 individuals were examined.

The positive findings are detailed below. Owing to the lack of information in many cases, it is not possible to separate the smears into those from Europeans and those from native Africans and others.

Subtertian malaria parasites only	...	...	...	36
Quartan malaria parasites only	...	...	...	15
Subtertian and quartan malaria parasites	...	...	...	5
Subtertian and Benign Tertian malaria parasites				2
Benign tertian malaria parasites only	...	...	...	2

Most of the above findings were recorded in a large series of blood smears from native Africans collected by Dr. K. K. Grieve at and around Mamfe, British Cameroons.

Embryos of <i>Acanthocheilonema perstans</i>	...	...	...	11
Embryos of <i>Filaria loa</i>	...	...	...	3
Embryos of <i>A. perstans</i> , and subtertian malaria parasites	...	...	...	3
Embryos of <i>Onchocerca volvulus</i>	...	...	...	1

Most of the slides showing embryos of *A. perstans* came from Mamfe also.

Spironema of Relapsing Fever	...	...	...	7
<i>Trypanosoma gambiense</i>	...	...	...	2
<i>Bacillus pestis</i>	...	...	...	1

The slides showing *S. recurrentis* came from the Northern Provinces as did also those showing *T. gambiense*, the patient in the latter group being in both instances, a European.

B. pestis in the peripheral blood occurred in an acute case of Septicæmic Plague in a native of Lagos.

Examination of Fæces.—538 samples were received, practically all of them from Lagos. There is not sufficient information to permit of tabulating separately the findings in the case of Europeans and of native Africans.

There were negative findings in 295 instances.

The positive results are shown under two headings, viz:—

- (a) Those with intestinal protozoa.
- (b) Those with ova of helminths.

Under the first heading (a) there are included in the Table (Table IX) indications of amœbic dysentery other than the actual finding of the causative entamœba, namely red blood cells, pus and epithelial cells and Charcot Leyden crystals. The organism termed Blastocystis is also included in the table, not because it is considered to be a protozoon but for purposes of convenience. The samples of fæces have been classified in three main groups according as they were "Formed," "Pultaceous" or "Liquid." Each group is further divided into those and those without obvious mucus. Four separate observers, working single-handed during their periods of office, are responsible both for the descriptions and the results so that there may well be some lack of a standard and of uniformity. Nevertheless the indications, in general, accord with those obtained under a similar arrangement of results collected by a single observer in the previous year and recorded in the Annual Report of this Institute for 1923. In the present table the term "negative" means that none of the named findings was noted, the fact being that in some of the cases, ova of helminths were observed but not included in the table.

TABLE IX.

	Formed.	Formed with mucus.	Pultaceous.	Pultaceous with mucus.	Liquid.	Liquid with mucus.
	—	+	—	+	—	+
<i>E. histolytica</i>	0	3	22	8	7	8
Epithelial and pus cells ...	2	4	9	6	4	15
Epithelial with Red blood cells	0	1	14	7	11	14
Charcot Leyden Crystals ...	0	0	4	1	0	1
<i>E. coli</i>	3	0	12	2	3	3
<i>E. nana</i>	0	0	6	0	0	1
<i>D. fragilis</i>	0	0	0	1	1	0
<i>I. bütschlii</i>	0	0	3	2	0	0
<i>Lamblia intestinalis</i>	1	0	5	0	1	0
<i>Tetramitus mesnili</i>	0	0	1	1	1	0
<i>Trichomonas</i>	0	0	12	2	6	1
<i>Embadomonas</i>	0	0	2	0	0	0
<i>Cercomonas</i>	0	0	1	0	0	0
<i>Blastocystis</i>	0	0	18	2	5	1
Negative	41	8	183	30	85	42
Total	47	16	292	62	124	86
Percentage positive ...	12·7	50	37·7	51·6	31·5	51·2

It will be seen that in each group the presence of mucus coincides with an increase in the positive findings. Such findings are smallest of all in the group where the stools are formed and mucus is absent. Pultaceous motions are considerably more frequent than the formed or the liquid, and it is in this group that the Blastocystis organisms predominate. A certain amount of gastro-intestinal derange-

ment, with fermentative changes in the fæces is commonly associated with the presence of *Blastocystis*, so far as experience in this Laboratory goes. The somewhat smaller percentage of positive findings in the "liquid" group as compared with the "Pultaceous" is probably to be explained by the inclusion in the former of a number of cases in which there was acute intestinal irritation due to bacteria, unsound food, inefficient cooking or other cause, these cases being of common occurrence and usually clearing up in a day or two.

Under the second heading (*b*), the figures are given below. It may be unnecessary to state that in practically all the cases the findings were obtained from stools of native Africans.

<i>Ascaris</i> ova ...	...	...	...	32
<i>Trichocephalus</i> ova	...	...	...	21
<i>Ankylostoma</i> ova ...	...	...	...	15
<i>Strongyloides</i> ova or larvæ	...	...	...	18
<i>Oxyuris</i> ova ...	...	...	...	5
<i>Tænia</i> ova ...	...	...	...	3

Urine.—Thirteen specimens were examined, the sediment after centrifugation being used for the purpose. Pus and epithelial cells were found in six and ova of *Schistosoma hæmatobium* in one.

Sputum.—Forty-eight samples were received. Tubercle bacilli were demonstrated in eleven, of which positive findings eight were from native Africans.

Smears from miscellaneous sources numbered 130 and there were no noteworthy findings.

Fluid.—Under this heading there were two specimens of effusion into the knee-point and two from cases of ascites.

Widal-Grunbaum tests.—Serum from twenty-four patients was received. The routine procedure is to put a serum up against *B* typhosus, *B* paratyphosus A, *B* paratyphosus B, *B* paratyphosus C, and *M. melitensis*. The result was positive to "para. B" in five cases and to "para. A" in three.

Vaccines.—Three of these were prepared.

Water Analysis.—Samples of water from nine sources were examined bacteriologically the routine being plating on agar and on McConkey and noting the formation of acid and gas in bile salt lactose neutral red broth.

Venereal.—The Sachs Georgi test was applied to fifty sera submitted. The result was positive in fourteen. This test has been adopted in preference to the Wassermann and the more recent substitutes owing to the simplicity of its technique and the satisfactorily high percentage of results which are in accord with clinical findings. In a laboratory where the entire range of pathological work devolves on one or at most two workers the simplest methods, consistent with reliability, have to be followed.

Eleven smears from chancre were stained by Fontana's method and four of these showed *Spironema pallida*.

Eight urethral smears were stained by Gram's method and also by Methylene Blue when duplicates were available. Gram-negative intracellular diplococci were noted in seven cases.

HISTOLOGY.

Sections were made from the following organs and reports thereon sent to the stations concerned:—

Liver	...	...	...	31
Spleen	...	...	...	22
Kidney	...	...	...	20
Lung	...	...	...	13
Lymphatic Gland	...	...	...	11
Brain	...	...	...	4
Stomach	...	...	...	4
Intestine	...	...	...	3
Heart	...	...	...	2
Uterus	...	...	...	1
Total	...	...	...	111

Thirty-six tumours were received for section. Of these twenty-seven were malignant and nine were benign. Of the malignant tumours, twelve were found to be carcinoma and fifteen were sarcoma.

The Carcinomas were:—

Scirrhus of breast	...	...	...	2
Adeno-carcinoma of breast	...	...	...	2
„ „ liver	...	...	...	1
Epithelioma „ jaw	...	...	...	1
„ „ tongue	...	...	...	1
„ „ lip	...	...	...	1
„ „ scrotum	...	...	...	1
„ „ penis	...	...	...	1
„ „ finger	...	...	...	1
„ „ amputation scar	...	...	...	1

The case of Epithelioma of the lip occurred in a European and all the others in native Africans.

The Sarcomatous tumours were:—

Fibrosarcoma of leg	...	...	...	...	3
„ „ „ arm	...	...	...	...	1
Round celled sarcoma of scalp	...	...	...	...	1
„ „ „ „ skull	...	...	...	...	1
„ „ „ „ back	...	...	...	...	1
Myxo-sarcoma „ face	...	...	...	...	2
Spindle-celled sarcoma of scapula	...	...	...	...	3
„ „ „ „ chest	...	...	...	...	1
„ „ „ „ foot	...	...	...	...	1
Melanotic sarcoma „ leg	...	...	...	...	1

One spindle-celled sarcoma occurred in a European, the others being in native Africans.

The benign tumours were:—

Fibroma	...	...	...	3
Lipoma	...	...	...	2
Osteoma	...	...	...	1
Fibro-myoma	...	...	...	1
Papilloma	...	...	...	1
Polypus	...	...	...	1

ENTOMOLOGY.

The work in this branch was done by Mrs. Summers Connal, M.B.E. who was absent from the Colony from March until September.

The main line of research followed was an examination of the local mosquitoes with the object of determining their internal parasites. The mosquitoes were brought in each morning by the labouring staff who had instructions to collect all the insects they could find in their huts. These collections were received and examined in January and February and in November and December.

Tæniorhynchus (*Mansonioides*) *africanus* proved to be the most frequently collected insect. The actual figures are:—

January— <i>Tæniorhynchus</i> (<i>Mansonioides</i>) <i>africanus</i>	196
<i>Anopheles costalis</i>	17
<i>Culiciomyia nebulosa</i>	31
<i>Culex thalassius</i>	1
Total	245

These were dissected in saline, under the binocular microscope.

Three *T. africanus* showed spironema in the stomach contents.

In one case in which these organisms were very numerous they were injected intraperitoneally into a guinea-pig.

The animal, however, was apparently unaffected.

Sporozoite-like structures were noted in the salivary glands of one specimen of *T. africanus*.

The results of the examination of the other mosquitoes were negative.

The mosquitoes obtained in February were:—

<i>Tæniorhynchus</i> (<i>Mansonioides</i>) <i>africanus</i>	109
<i>Anopheles costalis</i>	7
<i>Culiciomyia nebulosa</i>	3
<i>Culex rima</i>	2
<i>Culex thalassius</i>	1
Total	122

Spironema occurred in the stomach of three specimens of *T. africanus*, and active amoebæ were observed in the stomach of two others. A small nematode was found in the stomach of one specimen of *C. rima*. The results were negative in the remainder.

The insects examined in November were:—

<i>Tæniorhynchus</i> (<i>Mansonioides</i>) <i>africanus</i>	17
<i>Anopheles costalis</i>	1
<i>Stomoxys omega</i>	2
Total	20

Of these, only three gave positive results, all in *T. africanus*. Fungal filaments were very numerous in the stomach of one, a few amoebæ were seen in the stomach of another and slow-moving spironemata were noted in the stomach of a third.

In December the following insects were obtained:—

<i>Tæniorhynchus</i> (<i>Mansonioides</i>) <i>africanus</i>	...	...	...	...	36
<i>Anopheles costalis</i>	...	...	...	...	4
<i>A. squamosus</i>	...	...	...	...	1
<i>Cimex rotundatus</i>	...	...	...	...	6
<i>Glossina palpalis</i>	...	...	...	...	1
Total	...	...	...	...	48

Four *T. africanus* gave positive results. Two showed enormous numbers of spironema in the stomach, and in one of these the organisms were also present, in the salivary glands. In the stomach of a third, ova of *Ascaris* were noted. Numerous small amoebae were seen in the stomach of a fourth. Of the *A. costalis*, zygotes were present in the stomach wall of one, and in the thoracic muscles of another, three filaria larvae occurred. The results in the other cases were negative.

During October and November the following fleas taken from rats in Lagos, were dissected:—

<i>Xenopsylla cheopis</i>	...	...	32 ♂ ♂	11 ♀ ♀
<i>X. brasiliensis</i>	...	...	3 ♂ ♂	1 ♀ ♀
Total	...	...	...	47

In one male and one female *X. brasiliensis* a short thick nematode was seen coiled in a cyst, in the abdomen. The parasite appeared to be in the abdominal wall on the ventral surface at about its middle. The cyst equalled at least one and a half times the area of the spermatheca of the male.

Dr. K. K. Grieve kindly sent large numbers of biting flies from and around Mamfe. They were preserved in spirit and were all dissected in a search for filaria. The results were entirely negative.

These flies were:—

April	...	...	<i>Chrysops silacea</i>	...	...	7
			<i>C. longicornis</i>	...	...	1
			<i>Glossina palpalis</i>	...	...	5
			<i>G. caliginea</i>	...	...	4
			<i>G. pallicera</i>	...	...	2
			<i>Hæmatopota bullatifrons</i>	...	...	1
			<i>Tabanus taeniola</i>	...	...	4
			Total	...	...	24
May	...	...	<i>C. silacea</i>	...	...	47
			<i>G. caliginea</i>	...	...	1
			<i>Similium damnosum</i>	...	...	6
			<i>Tæniorhynchus</i> (<i>Mansonioides</i>) <i>africanus</i>	...	...	1
			Total	...	...	55
June	...	...	<i>C. silacea</i>	...	...	3
			<i>G. palpalis</i>	...	...	21
			<i>T. taeniola</i>	...	...	4
			Total	...	...	28

July and August.	<i>C. silacea</i>	...	...	...	40
	<i>H. bullatifrons</i>	...	...	...	1
	<i>S. damnosum</i>	...	...	...	101
	<i>G. palpalis</i>	...	...	...	10
	<i>Anopheles costalis</i>	...	...	...	1
	<i>Taeniorhynchus africanus</i>	...	...	...	1
Total					154

All the above were dissected in October.

Dr. Glover sent from Ikot-Ikpene:—

<i>Glossina palpalis</i>	...	...	4
<i>Tabanus thoracinus</i>	...	...	1
Total			5

These were dissected, but showed no filaria.

The following collections of insects were received, for identification:—

Dr. Moiser, Zaria, January.

<i>Lutzia (Culex) tigripes</i>	...	1 ♂	2 ♀ ♀
<i>Culex univittatus</i>	...	31 ♂ ♂	22 ♀ ♀
<i>C. decens</i>	...	2 ♂ ♂	3 ♀ ♀
<i>Anopheles costalis</i>	..	1 ♂	

Dr. Dyce Sharp, Zaria, February.

<i>Culex univittatus</i>	...	22 ♂ ♂	18 ♀ ♀
<i>C. decens</i>	...	9 ♂ ♂	9 ♀ ♀
<i>Lutzia (Culex) tigripes</i>	...	4 ♂ ♂	2 ♀ ♀
<i>Culex invidiosus</i>	..	1 ♂	3 ♀ ♀

Dr. Stephens, Ilorin, September and October.

Railway coach at Jebba— <i>Taeniorhynchus</i>			
(<i>Mansonioides</i>) <i>africanus</i>	...	...	2 ♀ ♀
Bred from larvae at Ilorin <i>Aedes (Stegomyia)</i>			
<i>argenteus (fasciata)</i>	...	...	5 ♀ ♀
<i>Taeniorhynchus africanus</i>			4 ♀ ♀

Dr. Wilson sent a *Glossina palpalis* ♀ from Benin City in October.

Dr. Grieve sent from Mamfe in January:

In October	<i>Tabanus ruficrus</i>	...	1 ♀
	<i>T. par</i>	...	1 ♀
	<i>Glossina palpalis</i>	...	7 ♀ ♀
	<i>G. tachinoides</i>	...	2 ♀ ♀
	<i>G. caliginea</i>	...	1 ♀
	<i>G. morsitans</i>	...	1 ♀
	<i>Haematopota lacesens</i>		2 ♀ ♀
	<i>H. grahami</i>	...	1 ♀
	<i>Chrysops silacea</i>	...	1 ♀
	<i>C. dimidiata</i>	...	1 ♀
	<i>Tabanus obscurefumatus</i>		2 ♀ ♀
	<i>T. taeniola</i>	...	1 ♀
	<i>T. argenteus</i>	..	1 ♀
	<i>Rhinomyza sp.</i>	...	1 ♀
	<i>Aedes (Stegomyia) argenteus (fasciata)</i>	...	7 ♂ ♂ 9 ♀ ♀
	<i>Taeniorhynchus (Mansonioides) africanus</i>		2 ♀ ♀
	<i>Similium damnosum</i>	...	3 ♀ ♀

The following mosquito larvae were received from the Medical Officer of Health, Lagos, collected by the Sanitary Inspectors.

January, eighty-five collections, sixty-nine containing *Aedes argenteus*.

Culiciomyia nebulosa was present in sixteen samples.

Culex decens accompanied *Aedes argenteus* in a sample from a well.

February, fifty collections, thirty-five containing *Aedes argenteus*.
Culiciomyia nebulosa was present in thirteen samples.

One sample contained *Culex fatigans* and *Culiciomyia nebulosa* along with *Aedes argenteus*.

Two samples contained only *Culex fatigans* one from a yard-pot and the other from a catchpit.

The identification of the fleas and other insects collected from rats is given under the Plague section.

ACKNOWLEDGMENTS.

Specimens were received from Dr. Adam, Dr. Adcock, Dr. Aitken, Dr. Allan, Dr. Booth, Dr. Braithwaite, Dr. Brierley, Dr. Cauchi, Dr. Cobb, Dr. A. Crawford, Dr. Crichton, Dr. Digby, Dr. Dyce-Sharp, Dr. Fetherstone-Dilke, Dr. Forde, Dr. Gallagher, Dr. Gaston, Dr. Gibson, Dr. Glover, Dr. Gray, Dr. Grey, Dr. Grieve, Dr. Hanington, Dr. Kelsall, Dr. Lee, Dr. McClintock, Dr. McCulloch, Dr. Mackey, Dr. McKay, Dr. McLeay, Dr. Maclaine, Dr. Maples, Dr. Fitzgerald-Moore, Dr. Morehead, Dr. M. Morrison, Dr. Neale, Dr. North, Dr. Oluwole, Dr. Parkinson, Dr. Pearson, Dr. Pollard, Dr. Ross, Dr. C. Sharp, M.C., Dr. Snell, Dr. Stephens, Dr. Thomson, Dr. Vaughan, Dr. Walker, Dr. Watt and Dr. Wynne Davies, O.B.E.

A. CONNAL.

Director, Medical Research Institute.

APPENDIX II.

ANNUAL REPORT.

OF THE

CLINICAL LABORATORY, LAGOS, 1924

BY

H. MORRISON, M.A. M.D., M.R.C.S.

THE CLINICAL LABORATORY—LAGOS.

There has been a Medical Officer in charge of the Clinical Laboratory, Lagos, for the whole year and the results below show a considerable increase in the material examined.

This is only to be expected, as in 1923 there was no Medical Officer detailed for work in the Laboratory during a greater part of the year.

The Medical Officers were Dr. C. J. Sharp, M.C., January—16th September and Dr. H. Morrison, 17th September—December.

Owing to the temporary nature and insanitary position of the Laboratory, practically all culture work, the preparation of Vaccines, and the cutting of sections were done at the Medical Research Institute, Yaba. All this work will henceforth be done in Lagos when the new Laboratory is built.

As mentioned elsewhere in the Report, Plague broke out in Lagos in July and again in August: all post-mortem examinations and subsequent smears were done in connection with the Clinical Laboratory.

During the first two or three weeks of the Plague outbreak proper, a considerable number of rats were examined: an opportunity was taken at this time to look for leptospira in kidney smears. This examination was done on account of a few cases of infective jaundice that had occurred in July—August, and most of which had ended fatally. The post-mortem findings macroscopically precluded all possibility of obstructive jaundice. In no single smear were any leptospira seen.

BLOOD EXAMINATIONS.

1,507 blood smears were examined of which 186 were those from Europeans: subtertian malarial parasites were found in twenty-three Europeans and twenty-two native blood smears. The reduction in native infection is in marked contrast to that in the previous year when a third of the number of blood smears was examined and thirty-seven infections discovered. This anomaly is most likely accounted for by the phenomenally dry 'wet season' in Lagos with a proportionate reduction in the number of mosquitoes.

The spironemata of relapsing fever were seen in five native smears. Fifty total blood counts were made, eighty differential leucocyte counts and sixty-one hæmoglobin estimations.

Fæces.—The total number of fæces examined were 1,429, of these 208 were from Europeans, and in examination *E. histolytica* was seen in eleven and the ova of *Ascaris lumbricoides* in one.

Of the remainder 1,221 (Native) the results were as follows:—

	<i>E. histolytica</i> ...	...	...	49
<i>Ova</i> .—	<i>Ankylostomum duodenale</i> ...			205
	<i>Ascaris lumbricoides</i> ...			522
	<i>Trichuris trichiura</i> ...			299
	<i>Strongyloides</i> ...			48

Urine.—Total number of examinations were 1,038.

No *S. hæmatobium* were found in the urine of Europeans (162): and in only seven native cases was *S. hæmatobium* seen out of 876.

Sputum.—Total examinations—184.

Of these fifteen were in Europeans with the presence of Tubercle bacilli in one: in the native total of 169, Tubercle bacilli were found in twenty-nine cases.

Smears.—537 smears were made from the kidneys of rats, solely for the purpose of finding *Leptospira* (referred to above). In no instance were the required protozoa seen.

1,475 other smears were made from various sources.

The findings were as follows:—

B. pestis	...	...	...	435
Gonococcus	...	...	...	26
B lepræ	...		...	1

Cultures.—Total—8.

<i>Results</i> —Meningococcus	...	...	...	2
Staphylococcus albus			...	1
B. pestis	...	...	...	5

Sections.—Total—3.

<i>Results</i> —Carcinoma	...	...	...	1
Sarcoma	...	...	...	2

Widal Test.—Total—1.

Result—Negative.

Sachs Georgi Test.—Total—40.

European eight positive in fifteen examinations.

Native eighteen positive in twenty-five examinations.

Vaccine.—One vaccine was made from *S. albus* found in a culture made from a tropical bubo. The bubo resisted all forms of treatment and healed up satisfactorily under vaccine therapy.

POST-MORTEM EXAMINATIONS.

662 post-mortem examinations were carried out in the Public and Hospital Mortuaries: this figure is a considerable increase on that for the preceding year and is to be explained by the outbreak of Plague in the latter half of the year 1924, during which time routine examinations were made on every person whose death was notified to the Sanitary Authorities and in these cases whose death was 'mysterious' and whose relatives left the corpse alone in the house, to be discovered later, either by the Police or Sanitary Inspectors, from information given by neighbours,—not too adjacent to the deceased's abode.

In the first six months of the year, fifty-seven post-mortems were carried out in the above-mentioned mortuaries. The majority were performed on Coroner's Orders and the cause of death almost invariably attributed to drowning or some form of accident.

Prior to the first case of Plague and during the Plague epidemic there were a certain number of somewhat sudden deaths: post-mortem examination revealed pathological changes typical of influenzal pneumonia.

In a number of those cases sections were made of lung tissue and there were seen long-chained streptococci together with *M. catarrhalis* and slender bacilli. The pneumonia was broncho-pneumonic in type: in ten examinations the broncho-pneumonia was septic and in two other

cases patches of lung tissue were gangrenous. Many other cases of pneumonia and broncho-pneumonia of non-influenzal origin occurred and are to be attributed, one would imagine, to the very cool weather conditions prevailing from June to September, during which period the heavy rains failed in an extraordinary manner.

The first case of Plague (Bubonic) occurred on the 28th July, followed by a three weeks' lull, when on the 22nd August a further case was notified, heralding the epidemic proper.

From now on, the cases increased to a maximum in October and post-mortem examinations numbered between eight and fourteen daily.

As is seen by the figures below, the majority of cases were bubonic in type, the bubo or buboes gradually increased in size week by week as the epidemic reached its maximum and then began to abate, synchronising also with the decreasing virulence of the bacillus.

Of the pneumonic plague, it is safe to venture an assertion that climatic conditions, the immunity of the people (although it is difficult to imagine any immunity) or the 'mild' strain of organism each or all, must have played some part in preventing any rapid spread from person to person. Still more extraordinary is it when one appreciates how natives, in all tropical countries, live closely confined in their huts.

In the majority of cases one, or both lungs were merely congested in one case an area of only two square inches was affected and repeated smears of other parts of the lung proved negative for *B. pestis*.

All reports of post-mortem examinations were telephoned to the Medical Officer of Health who was thus able to remove contacts to the Infectious Diseases Hospital and to bring the infected areas under necessary sanitary control.

Among such a number of examinations, an occasional post-mortem of non-epidemic interest occurred here and there—Smallpox, Carcinoma of the stomach (with extensive secondary deposits in the Liver), Sarcoma of Skull and Addison's disease: but the one to which unique interest is attached was a case of poisoning by cyllin.

Around this rare and previously unknown local form of suicide, there hangs a tale interwoven with romance that is at once humorously alien to the psychological demeanour of the West African.

The unfortunate man was a Government clerk, who as his colleagues asserted, loved a lady from a motive of true affection: he was thwarted in his amorous attentions by a fellow clerk and ungallantly parted with his sore-wounded spirit by consuming exactly one pint of pure cyllin.

Cardiac Disease was seen in elderly natives, the average age of death being over 50. In 25% of cases the aortic valves were sclerosed and sclerotic patches noticed on the first part of the aorta: in others where the deceased persons had lived well and had become proportionately obese, fatty degeneration of the myocardium was marked, together with dilatation of the left ventricle and incompetent mitral valves.

Tubercle.—The number of corpses in whom signs of Tubercle were evident appears small and cannot be regarded as a true representation of the incidence of the disease in Lagos.

As has been mentioned before, post-mortem examinations, during the Plague Epidemic, were performed 'quam celerrime' and no special routine effort was made to discover the incidence of Tuberculous infection as manifested by caseous glands, etc. One may safely assume,

however, from clinical pathological examinations that the figures detailed below are decidedly on the low side and that Tubercle, as far as Lagos is concerned, takes a considerable toll of life among the native population.

The case of Carcinoma of the stomach (Pylorus) is interesting in view of the controversy, always raging, as to the real likelihood of Cancer in native races comparatively low down in the human scale of civilisation. The native thus afflicted was not of the educated class of African.

It is well known that, when financial means allow, the natives of Nigeria will consume tinned foods with avidity. To consider in any way that such products of civilisation can have any deleterious effect internally is highly speculative, but it must be remembered that such a diet is extremely antithetical to their own, vegetarian food.

Below are tabulated the 605 post-mortem performed during the last six months of 1924.

POST-MORTEM—1ST JULY TO 31ST DECEMBER, 1924.

<i>Plague.</i>	Bubonic	...	...	...	210
	Pneumonic	...	...	...	20
	Septicaemic	...	...	...	17
<i>Pneumonia.</i>	Broncho-pneumonia	...	...	...	158
	Lobar-pneumonia	...	...	...	48
<i>Natural Causes</i>	...	...	...	...	43
<i>Cardiac Disease</i>	...	...	...	...	29
<i>Drowning</i>	...	...	...	...	22
<i>Amoebic Dysentery</i>	...	...	...	...	18
<i>Tubercle.</i>	Pulmonary	...	...	...	10
	Abdominal	...	...	...	1
<i>Purulent Bronchitis</i>	...	...	...	...	7
<i>Infective Jaundice</i>	...	...	...	...	4
<i>Accidents</i>	a. Rupture of Spleen	...	...	...	—
	b. Fracture of Skull	...	...	...	—
	c. Multiple knife injuries	...	...	...	3
Puerperal Septicaemia	...	...	...	...	2
Pleural Effusion (streptococcal)	...	...	...	...	2
Smallpox	...	...	...	...	2
Burning	...	...	...	...	1
Carcinoma of Stomach	...	...	...	...	1
Tetanus	...	...	...	...	1
Gonococcal Salpingitis	...	...	...	...	1
Addison's Disease	...	...	...	...	1
Perforated Duodenal Ulcer and General Peritonitis	...	...	...	...	1
Sarcoma of Skull	...	...	...	...	1
Interstitial Chronic Nephritis	...	...	...	...	1
Poisoning by Cyllin	...	...	...	...	1
Total					605

H. MORRISON.

APPENDIX III.

REPORT OF GOVERNMENT ANALYST,

MR. A. B. HOBSON, M.SC., A.I.C.

Period January 1st to July 31st, 1924.



GOVERNMENT ANALYST'S LABORATORY, YABA.

The work in the laboratory has proceeded steadily throughout the six months, January 1st to July 31st, covered by this report.

During the period, the number of samples submitted for analysis amounted to 165, their nature being as detailed.

Waters and Aerated waters	...	...	...	9
Beers, Wines and Spirits ..	...	...	...	23
Perfumes and Essences	...	...	...	37
Pharmaceutical preparations	...	...	...	11
Food	...	...	...	35
Toxicological	...	...	...	16
Police samples	...	...	...	15
Miscellaneous	...	...	...	19
				<hr/> 165 <hr/>

WATER.

Lagos Town Supply.—The purity of this water is steadily maintained. In connection with the solvent action of this water, and particularly as regards the action on the galvanised service pipes, it is interesting to note that the Analyst's recommendation that pipes treated with a solution of the Dr. Angus Smith type should be substituted, has been confirmed by consultants at home.

The results obtained from the analysis of samples of water received from Port Harcourt indicate the necessity for the strictest cleanliness and care in sampling. By chance, samples of water from the European well, Port Harcourt, were taken both by the Deputy Director of Sanitary Service, and by the Public Works Department. The analysis of the sample taken by the Deputy Director of Sanitary Service showed the water to be of fair purity, whereas the only interpretation to put on the figures obtained from the second sample was that the water was contaminated by organic matter of an animal origin.

As the analytical data obtained from various samples of *Port Harcourt* water showed rather an unexpected degree of purity the figures may be worth quoting.

				P.W.D. Well.		Loco. Well.	Cold Storage Well.
				A.	B.		
Saline Ammonia	...	...	...	Nil	0·0085	Nil	Nil
Albuminoid Ammonia	...	...	...	0·0005	0·0020	0·0010	0·0005
Nitrite	...	...	...	Nil	Nil	Nil	Nil
Oxygen Absorbed (3 hrs. lab. temp.)	...	...	...	„	0·0066	0·0039	0·0013
Total Hardness (degrees)	...	...	...	3·0	3·0	3·0	3·0
Total Solids	...	...	...	4·0	3·8	3·6	3·7
Chlorine	...	...	...	0·5	0·5	0·45	0·5

Incidentally, the low chlorine figures indicate that infiltration of sea water into the wells does not take place.

It should be noted that the bacteriological examination of these waters did not give such satisfactory results, possibly owing to the difficulties attending the transport of water samples over long distances in a tropical climate.

Kano.—Samples of water taken from two of the proposed sources for the new Kano supply, Rafin Karia and Kogun Komanda, have been investigated chiefly from the physical side.

The water from both sources was unattractive, and obviously very impure, so that the obtaining of the necessary data, as to the degree of purity which might be finally attained, was of primary importance.

It was found that only the most efficient filtration would remove the suspended matter from the Rafin Karia sample, an efficiency which probably cannot be obtained outside the laboratory except at great expense. In the case of the Kogun Komanda sample, chemical treatment was necessary in the laboratory.

As the results obtained may be of some interest, showing the type of water which has to be utilised in the tropics, they are given below.

All results are expressed in parts per 100,000 of water, *i.e.* in pounds per 10,000 gallons.

(1). MATTER IN SUSPENSION.

	Rafin Karia.	Kogun Komanda.
(a) Total solids in suspension exclusive of matter in colloidal suspension ...	86·8	13·4
(b) Amount of suspended matter settling in two hours	62·8	4·3
(c) Amount of suspended matter settling in 17½ hours	74·3	7·6

The above figures, although actual experimental values obtained, are only approximate, as they obviously depend on the human element in sampling.

(2). TOTAL SOLIDS IN COLLOIDAL AND TRUE SOLUTION.

The waters were filtered through an ordinary paper, and the values here given include all matter which was not thus removed.

	Rafin Karia.	Kogun Komanda.
(a) Total solids not removable by a single filtration dried at 100°C.	5·6	12·2
(b) Loss in weight on ignition — Organic matter plus any carbon dioxide	2·8	4·6
(c) Residue (inorganic)	2·8	7·6

(3). TOTAL SOLIDS IN SOLUTION AFTER CLARIFICATION.

By repeated filtration, it was possible to obtain a perfectly clear water from the Rafin Karia sample.

To clarify the Kogun Komanda sample, a solution of alum was employed and a correction afterwards applied to the value for total solids obtained.

	Rafin Karia.	Kogun Komanda.
(a) Total solids in true solution dried at 100°C.	2.2	4.5
(b) Loss on ignition (organic) matter plus carbon dioxide	1.9	1.2
(c) Residue (inorganic)	0.3	3.3

(4). MATTER IN "COLLOIDAL" SUSPENSION.

The values here given may be defined as the matter not in true solution, but which cannot be removed by passing once through a filter paper.

	Rafin Karia.	Kogun Komanda.
Matter in "Colloidal" Suspension	3.4	7.7

N.B.—As will be seen from (3), these figures merely depend on the efficiency of filtration.

(5) IRON.

	Rafin Karia.	Kogun Komanda.
Expressed as metallic iron ...	0.16	0.14

Several samples of water have been examined in connection with boiler corrosion. One of these was the feed water of the Electric Power Station, Ijora (Lagos Supply). Although Lagos water is very soft, it is slightly peaty, and the acidity determined on the sample of feed water supplied was equivalent to 0.92 parts per 100,000 of carbonic acid gas.

The addition of caustic soda in the amount of 1 lb. to 12,000 gallons of feed water was recommended, and although a certain amount of action on brass, etc., parts was observed, the addition of caustic soda appears to have stopped the boiler corrosion.

FOOD.

Thirty-five samples of tinned foods of various descriptions were analysed.

All were satisfactory.

One of the most noticeable features of the tinned vegetables, was the use of copper for coloring to the extent of more than 0.2 grains per lb.

As tinned peas, etc. are chiefly imported for European consumption, in a country where green vegetables cannot be obtained, these repeated doses of copper must be a little detrimental to general health.

There is absolutely no necessity for the use of copper in this way, the only improvement to the vegetable, being in the colour.

A sample of the dried native fish, Corvina, was analysed, with a view to its incorporation in the prison diet. The fish proved rich in protein, and the figures obtained were very similar to those for haddock.

Moisture at 110°C	28.7%	On dry weight.
Fat	2.1%	3.6%
Protein	56.3%	79.0%

The analysis represents a calorific value of about 250 calories per 100 grams of fish as received.

PHARMACEUTICAL PREPARATIONS.

Eleven pharmaceutical preparations have been received for analysis chiefly for Customs purposes.

The only matter for comment is, that poisons in the first schedule are being sold in Nigeria, by the native assistants of the mercantile community.

The fact that a preparation is made up to a more or less standard formula, does not diminish the danger of ignorant handling of such preparations.

TOXICOLOGICAL.

Sixteen specimens of human viscera, vomit, etc., have been received, and the necessity for information as to symptoms, etc. must be emphasised, in order that the analyst working with a very small quantity of material may use that material to the best advantage.

In two cases, the probable cause of death was attributed to the presence of a cyanogenetic glucoside in cassava. Poisoned Arrows and needles coated with a greenish fungus, have been received. A scratch from either would be sufficient to cause septicaemia from bacterial infection.

POLICE CASES.

The samples submitted, came mainly under the term "Juju." These are mostly quite harmless, charcoal being the main constituent. As these mixtures may be bought with comparative ease, even in the large towns, it is only to be expected that the vendor would not run the risk of a collision with the authorities.

One such preparation received here had been placed in the whisky, gin and marmalade of a European resident in Lagos, and proved to be practically pure charcoal, with a trace of calcium carbonate and silica possibly through having been prepared on a cement floor. The whisky and gin were both sampled by the analyst after removal of the powder in suspension, with no noticeable effect.

In connection with a prosecution for coining in Lagos, the prisoners's stock of chemicals and specimen coins was forwarded for analysis. The chemicals employed were obviously intended for the purpose of electrogilding; borax, caustic soda, potassium sulphocyanide, a double cyanide of gold, and potash (both the solid and a dilute solution) were identified.

MISCELLANEOUS.

An investigation as to the possibility of arsenical contamination of wells in Northern Nigeria, during the process of fellmongering was carried out for the Deputy Director of Sanitary Service. Soil samples were taken at various depths and distances from one place where this was carried on, and finally a sample of soil from a dry well quite close to the scene of operation. It was found that complete fixation of the arsenic was attained—probably on account of the ferruginous soil—and the sample from the well showed no trace of even insoluble arsenic.

Samples of Road Tar were received from one consignment, and it was complained that granite coated with this Tar "set hard like coal."

All samples were destructively distilled, and it was found that the consignment was deficient in pitch for all purposes. All samples gave different results on analysis, as to the percentage of moisture, light,

medium and anthracene oils and pitch; and it was concluded that either the consignment was a mixed one, or it had undergone a partial separation into its constituents before running into drums.

A complete fortnight was spent in the preparation of sodium potassium bismuth tartrate for experimental purposes in connection with the treatment syphilis and yaws.

The method adopted was partially the method used in Kenya Colony.

Bismuth Oxide was prepared by heating the oxycarbonate, and was then powdered up in a mortar with ten per cent. more than the theoretical quantity of tartaric acid to secure complete admixture, and the mixture made into a batter with water. The Bismuth tartaric acid was filtered at the pump, washed with hot water to remove the excess of tartaric acid; pressed and drained.

The bismuth tartaric acid so obtained was now *exactly neutralised* with a syrup of soda and potash in molecular proportions.

To obtain this, almost exact neutralization, a little of the bismuth tartaric acid was kept back in case excess of alkali was added.

The neutral or faintly acid liquor obtained was *slightly diluted* at this stage in order to expedite filtration, and afterwards the final product obtained in the way described by Mr. Kirkham (Laboratory Report Nairobi, 1923).

No difficulty was experienced in making a salt containing over 50% of bismuth oxide, the trouble experienced was in making a *soluble neutral* salt of such a standard. In my first attempt, the neutralization by mixed alkali, was not carried to completion, with the result that the product obtained after concentration, and pouring into alcohol, was acid, and not completely soluble.

One had the anomaly of a substance which was so soluble, that it would pass through a filter paper, almost as a syrup, and later on, when one wished to redissolve it in water, was only partially soluble.

The obvious conclusion was that an acid salt had been partially made or that bismuth tartrate was soluble in the neutral salt which amounts to the same thing, and further that this unstable acid salt on dilution, broke up into the soluble bismuth tartar emetic and the only slightly soluble, bismuth tartaric acid.

EDUCATIONAL.

For the last three months or more, of the half year, lectures have been given at the hospital, to twenty-seven of the local dispensers in Elementary Chemistry and Physics. The results to be obtained by such instruction cannot be very great, until proper accommodation is provided for students.

The Analyst has also served on a committee, appointed to investigate the question of a proper training and qualification for licensed druggists and dispensers in Nigeria.

He proceeded on leave after eighteen months' tour on August 29th, 1924.

A. B. HOBSON.

APPENDIX IV.

SCIENTIFIC PAPERS.



EXTRA SHEETS "C".

SCIENTIFIC.

There is little to record in this Section.

INGUINAL HERNIA.

One of the chief problems which confronts the surgeons in West Africa is the operative treatment of the enormous (usually sliding) hernias that are so commonly met with. These cases are not seen at home, because a hernial condition would receive appropriate treatment long before it reached such a stage. The state of these sufferers is deplorable and their lives are a misery, with possibly the greater portion of the intestinal contents of the abdomen hanging in an irreducible hernial mass, even down to the level of the knee joint.

Although it is usually possible to restore, by operative surgery, the hernial mass to the abdomen, it cannot be said that the end-results are satisfactory. The usual operative procedure, after opening the sac and restoring the free bowel to the abdomen, is to separate the sliding portion of the hernia (which frequently contains the bladder, caecum and ascending colon or sigmoid) from the surrounding tissues, excise as much of the free sac as possible, suture up the remainder, and then restore the sliding portion "en masse" to the abdomen.

This often necessitates incising the internal oblique and transversalis muscles above Poupart's Ligament for a distance, if the mass is a large one, of possibly two inches, with consequent weakening of the abdominal wall. If, however, the sliding portion of the hernia only contains a part of the bladder, I find it is better practice to excise the portion of the viscus present as it completely obviates the necessity for restoration of any part of the hernia "en masse" and moreover the patient suffers no inconvenience from this partial Cystectomy. Once back, the inguinal region is repaired by one of the numerous methods in use; personally, I employ Halstead's method of Anterior Plication. The operation is a severe one, and in elderly people, who form the bulk of the patients, attended with an appreciable mortality. In those that recover, the restoration of such a large mass of bowel to an abdomen, whose capacity, owing to its contracting down during the years the bowel has been absent in the hernial mass, has greatly decreased, causes a sudden increase of intra-abdominal pressure with the result that, in a short while, the hernia comes down again either on the same or on the other side. To prevent this, a few years ago, I was in the habit, after repair of the hernia, of inserting silver wire filigrees according to MacGavin's method. I found, however, that they frequently led to suppuration and had to be removed so that I was forced to abandon their use, although I still see old patients from time to time in Calabar, who are perfectly and permanently cured by this filigree operation.

There is one valuable result accomplished by operation, and that is, the patient is put in condition where he can wear a truss, and now-a-days I impress on my successful cases the necessity of their wearing a double inguinal truss for the remainder of their lives.

SPLENECTOMY.

The spleen was excised in a young male African (E. U. No. 540/24) aged about twenty-five years, who begged to have it removed on account of its constant aching pain and discomfort.

Upon admission, the organ was considerably enlarged and projected about two inches beyond the costal margin, while the patient was anæmic and having constant low fever, the temperature ranging between

99° and 100° F daily. The enlargement of the spleen was presumably of malarial origin, for although I have long suspected that many of the enlarged spleens in West Africa are often of syphilitic origin (congenital or acquired), I have been unable to verify my belief, on account of the lack of facilities for having the Wassermann reaction carried out in Calabar.

Nevertheless I thought it prudent in this case to have the patient treated for some five weeks in hospital before operation, with both quinine and antispecific remedies. He was given by mouth ten grains of quinine twice daily, as well as Potassium Iodide and Mercury, while he received five injections of Novarsenobillon intravenously.

Blood count examination were made twice before operation, on the first occasion before the above-mentioned treatment was commenced, and on the second occasion towards its completion. The results were:—

	Eight weeks before operation.	Ten days before operation.
Total Red cells	2,718,125 per cmm	2,734,375 per cmm.
Total white cells	10,000 ..	9,375 ..
Hoemoglobin Estimation	55%	55%
Differential white cell count:—		
Lymphocytes	22·03%	16·17%
Large Mononuclears	8·47%	14·28%
Polymorphonuclears	48·47%	51·68%
Eosinophiles	10·84%	10·71%
Transitionals	10·16%	7·14%
	99·97%	99·98%

On the 10th November the spleen was excised by the usual left paramedian incision from the costal arch downwards. It was found embedded in such a dense mass of adhesions that I had grave doubts as to the wisdom of attempting to remove it. However, after very great difficulty, involving considerable physical exertion, I succeeded in separating it from its adhesions, although in doing so the left lobe of the liver was torn. The spleen was then brought outside the abdomen, and after its pedicle had been clamped, it was excised. The pedicle was then tied off and the tear in the liver sewn up. There was some haemorrhage from the diaphragm where adhesions had been separated, but the bleeding points were caught up by a curved needle threaded with catgut and tied.

After this the abdomen was closed.

There was considerable shock for some thirty-six hours after the operation, but the patient then rallied, made an excellent recovery, and subsequently expressed himself very pleased with the final result.

Two blood count examinations were made after the operation with these results:—

	Eighteen days after operation.	Twelve weeks after operation.
Total Red cells	2,931,250 per cmm	2,968,750 per cmm
Total White cells	9,375 ..	8,750 ..
Haemoglobin Estimation	55%	70%
Differential white cell count:—		
Lymphocytes ...	18·96%	15·00%
Large Mononuclears	10·34%	18·33%
Polymorphonuclears	51·72%	47·33%
Eosinophiles ...	6·89%	13·33%
Transitional ...	12·06%	6·00%
	99·97%	99·99%

The benefits derived from the operation therefore were:—

- (1) Complete abolition of pain and discomfort.
- (2) Cessation of constant low fever.
- (3) Cure of the anaemia.

PNEUMOCOCCIC INFECTIONS.

I have already remarked elsewhere (Section 111 Hospital and Dispensaries) that the pneumococcic infections were particularly virulent during 1924. In addition to the severity of the symptoms of the uncomplicated pneumonias, out of thirty-four cases of Lobar Pneumonia warded at the Native Hospital during 1924, no less than six died with purulent (pneumococcic) meningitis, while two ended fatally in gangrene of the lung, one of which also had multiple small abscesses of the brain possibly due to a pyaemic infection causing a suppurative pneumococcic venous thrombosis. These lesions were verified by post-mortem dissections. The usual percentage of meningeal infection in cases of lobar pneumonia is variously given from as 2·4% to 3·5%, but in the series of cases treated at the Calabar Native Hospital during 1924 the percentage works out at 17·7%.

CIRRHOSIS OF LIVER.

From time to time cases of cirrhosis of the liver with enormous ascites are met with in West Africa. I attach below photographs of two women, that will give some idea of the extraordinary distension of the abdomen that may occur in these cases.

The patients usually present no symptoms beyond those due to the pressure of the fluid in the abdomen *e.g.* shortness of breath, etc. There is no jaundice, no albumen can be found in the urine, and the legs are usually only slightly, if at all, oedematus. Diagnosis is therefore difficult, and in women a very large ovarian or parovarian cyst may be thought of. The liver in these cases is of the very small, contracted cirrhotic type, and usually the spleen is in the same condition.

The origin of the disease is unknown, but it is certain that in most cases alcohol is not a causative element. Frequently the patients are comparatively young, not much more than thirty years of age. Personally, I am inclined to think the disease is of syphilitic origin, but until there are facilities in Calabar for having the Wassermann reaction carried out, this point cannot be elucidated.

No treatment is of avail; in some cases I have opened the abdomen and performed an Omentopexy but without any benefit.

A CASE OF MALIGNANT TUMOUR OF HEAD OF THE PANCREAS INVOLVING THE LIVER.

BY G. F. FORDE

Senior Medical Officer, Port Harcourt.

Patient a European was sent up from Degema with a history of a low fever which failed to respond to repeated intramuscular injections of quinine.

Examination on Admission.—Temperature 101. Pulse 80. Spleen much enlarged. Liver not obviously enlarged. Gastritis. Albuminuria. No parasites in blood. Jaundice. In spite of treatment patient gradually got worse and became profoundly comatose on the 10th day after admission dying two days afterwards.

Post Mortem.—A hard tumour of the head of pancreas was found with a secondary nodule in the liver. Specimens were sent to the Research Institute Yaba and following report received. “No sign of tumour growth in the pancreas but liver looks like a sarcoma.” Report stated that both specimens were being sent home for further examination.

CASE OF AMŒBIC ABOCESS OF SPLEEN.

By H. R. M. FERGUSON,
Medical Officer, Port Harcourt.

The patient was admitted with a large painful swelling in the region of the spleen. The swelling felt quite hard and there was a vague history of slow growth. A laparotomy was done and the spleen was found entirely walled off with adhesions. The swelling was then opened externally and a large quantity of white odourless pus escaped. Living *E. Histolitica* were easily observed in the pus. Treatment with emotin injections rapidly cleared up the condition. The patient could not remember having suffered from dysentery and examination of his stools was negative.

APPENDICITIS.

By DR. H. R. M. FERGUSON, M.D., CH.B., etc.

Nine cases of inflamed appendix came under observation during the year 1924.

(a) Two cases were elderly men—at operation in both cases there was chronic inflammation with suppuration at the tip of the appendix. In one case the appendix was adherent to the ilium causing a sharp kink of the small gut. In the other case the appendix was adherent behind the caecum. Both patients gave the same history of constant pain in the appendix region—and both had marked tenderness on pressure over McBurney's point.

(b) Two cases occurred in youths of about eighteen years of age. The appendix was acutely inflamed in both cases—without adhesions.

(c) Two cases of perforated appendix were treated—the patients being artisans employed by the Railways Engineering Department. They were brought in to hospital exhibiting the classical symptoms of acute abdomen. No clear history could be obtained. A large quantity of pus was found in the abdomen in both cases and gangrenous appendices removed.

All the above cases made uneventful recovery. The two cases (a) gave a history of previous dysentery but the Caecum and ascending colon in both appeared quite healthy.

(d) Two elderly men were admitted with a condition which was diagnosed as inflamed inguinal hernia. In both cases the Caecum and an inflamed appendix were in the hernial sack. Death resulted in both cases within forty-eight hours.

(e) Case of Acute appendix accompanying a right pyosalpinx. A woman aged about twenty-five years was sent to Port-Harcourt from Enugu by Dr. Fitzgerald Moore who had made a thorough examination and sent very clear notes on the case.

The attack commenced with severe abdominal pain for four days before Dr. Moore saw the patient. There was Metrorrhagia and vomiting following the attack—bowels confined—and difficulty in passing water. The pain was then referred to the region of the lower rectum. When seen by Dr. Moore the pain was too great for a satisfactory vaginal examination. The Os was closed and the right fornix very tender—the body of the Uterus was drawn over to the right. There was also definite tenderness in the right iliac fossa. On arrival in Port-Harcourt the patient stated that the pain had lessened during the journey. Examination showed marked tenderness over appendix area and a definite boggy tumour in the pouch of Douglas. At operation a suppurating appendix was found—while the right tube full of pus and almost gangrenous lay behind the uterus. Both tube and appendix were removed. The appendix was not in any way attached to the tube but pointed upwards and was adherent to omentum. Recovery was uneventful.

CASE OF POST PARTUM INCONTINENCE OF URINE OF SIX YEARS STANDING.

By Dr. H. R. M. FERGUSON,

Medical Officer, Port Harcourt.

The patient was admitted suffering from prolapse of the Uterus, cystocoele and complete incontinence of urine. There was a vague history of difficult labour six years previously. The length of time however is doubtful. The stages of the treatment were as follows — a hysteropexy suprapubic drainage of bladder and advancing and twisting urethra— anterior colporrhaphy and tightening neck of bladder. The net result is that the patient has control in the day-time but experiences some trouble at night.

CASE OF ATRESIA VAGINAE AND CONGENITAL MALFORMATION OF UTERUS.

By H. R. M. FERGUSON,

Medical Officer, Port Harcourt.

The patient aged about fifteen years was well developed and apparently in excellent health. She had never menstruated and suffered no discomfort from the malformation. The vagina was represented by a firm membrane with a median raphe stretching from the meatus Urethrae to the anus. By Bi-manual rectal examination under Chloroform nothing corresponding to the uterus could be felt in normal position. A hard tumour could be palpated higher up. A Laparotomy was done, and a bi-cornuate body was found at the level and just to the right of the sacral promontory. It felt like a sausage bent on it self with the two ends upwards. There was no posterior pouch of peritoneum: so palpation could only be done from the front. This structure was tilted to the left so that the right broad ligament in rudimentary condition was almost vertical. Both ovaries seemed normal: but the fallopian tubes could not be found; as there was no evidence of a cervix or vagina.

CASE OF MALIGNANT DISEASE OF PANCREAS.

By Dr. H. R. M. FERGUSON,

Medical Officer, Port Harcourt.

The patient an elderly woman was admitted suffering from jaundice and ascitis. There was a vague history of long continual ill-health with attacks of vomiting. The abdomen was tapped several times and a large quantity of blood stained fluid withdrawn. After tapping, an elongated modular tumour of the shape and in the position of the pancreas was easily palpated by Dr. Forde and Dr. Ferguson. The condition of the patient prohibited any attempt at operation. She was steadily getting worse when she left the hospital and on returning six weeks later a tumour was visible in the epigastic region—the stomach possibly being involved.

TWO CASES OF SCIENTIFIC INTEREST, OBSERVED AT DEGEMA.

By Dr. GEORGE WILSON.

CASE 1.

Spina bifida with Meningocele and Hernia cerebri Frontal.

A child, two days old was brought in with a well-marked meningocele over the Sacrum. There was a considerable absence of the central bony parts of the Sacrum. There was also almost a complete absence of the frontal bones of the Skull, causing the Hernia cerebri.

Though each deformity may occur comparatively frequently the occurrence of both deformities in the one individual may be sufficiently rare to be worth recording.

CASE 2.

Aneurysmal Varix of the Head.

This case was interesting from the freakish appearance of the man.

There was a large soft pulsating tumour on the top of the head. The man had received an injury to the head, when a boy. All the blood-vessels of the brow, the sides, and the back of the head were markedly dilated and tortuous until they disappeared in the fleshy parts of the neck and face.

The appearance was like a cuttlefish perched on the top of the Head, with all its tentacles spread out.

The man complained of no inconvenience or pain.

I regret that photographs were unable to be obtained of these two cases.

MAMFE.

By DR. GRIEVE.

A Table showing the Prevalence of Microfilaria in the Blood of Natives living at or below 700 feet above Sea Level, together with the results of examination of a few films from natives living at 3,000 and 4,700 feet up but within a day's trek of the plains.

					700 feet or lower.	Per centages.	3,000 feet.	4,700 feet.
Number examined	...	...	...	...	1,150	...	100	50
Negative	...	...	...	...	210	18·3	20	36
Mf. Perstans	...	...	...	...	732	63·6	70	27
Mf. Perstans and Loa	...	...	...	...	171	14·9	1	4
Mf. Perstans and Bacrofti	...	...	...	...	2	0·2	...	...
Mf. Loa	...	...	...	...	28	2·4	1	1
Mf. Bancrofti	...	...	...	...	4	0·4	...	...
Mf. Bancrofti and Loa	...	...	...	...	1	0·1	...	...
All Three	...	...	...	...	2	0·2	...	...

All films taken between 8 a.m. and noon.

A Table showing the variety of parasite found in the Examination of 220 positive films taken from natives suffering from malaria.

				Per cent.
Subtertian alone	...	...	...	82·5
Subtertian and Quartan	...	...	...	3·5
Subtertian and Benign Tertian	...	...	...	1·4
Quartan alone	...	...	...	10·8
Tertian alone	...	...	...	1·8

A CASE OF TRYPANOSOMIASIS IN A DOG.

By DR. GRIEVE.

A Director of Medical Service wrote that “the duties of a Medical Officer are manifold;” quite frequently they include the treatment of animals, that is my excuse for writing the following, there is nothing new in the treatment but the report may be of use in deciding not only the drug but the dose to be used, I was unable to find any reference to the latter and believe the amounts used were larger than recommended in some books.

The dog, a small fox terrier born in Lagos eighteen months before, was probably infected on the road from Ikom to Mamfe; trypanosomes (*T. Dimorphon*) were first seen in blood films on March 29th 1924, treatment commenced on that day and ended on June 27th; during that time twenty-three intra muscular injections were given, five of Atoxyl, two of Soamin, one of N.A.B. and fifteen of Tartar Emetic.

Atoxyl was started with a dose of a quarter grain which was increased to a half. Soamin was then tried in the latter dose, the animal got worse and worse, the trypanosomes flourished exceedingly, a small dose of Novarsenobillon produced an intense local reaction which lasted for weeks. Death seemed very near when one-eighth of a grain of Tartar Emetic was given, within twenty-four hours there was a marked effect on the parasites, the dose was increased to a sixth and that was found to be the most efficacious one, it was given every four days at first, then every five and finally every six, no tolerance was established, the general reaction being most marked at the end of treatment, the last dose being the worst.

No trypanosomes have been seen for over six months.

DIAGNOSES FRACTURED.

BY DR. GALLAGHER.

CASE 1.

No. in Case Book, 111.—Date of admission, 20/6/24.—Discharged 6/11/24.

Age 30 years, Tribe Jaunde, Occupation Labourer.

A case of fractured base of skull, as well as fractured vertex. The scar of the latter is well shown in the left photograph, as the result of being flung off a railway-truck while going down hill and with brake jammed.

The injury proved to be four inches long over the left temporo-frontal parietal angle with fracture of the outer table of skull and severe Haemorrhage from the left arm and ear.

The patient was semi unconscious for six days, partial paralysis of right arm and leg with paralysis of left face was early discovered, also complete deafness and loss of vision on that side.

The peripheral paralysis quickly passed away. The deafness more slowly improved and the facial paralysis was at the time of discharge hardly noticeable. The loss of sight showed no improvement and is likely to be permanent.

DIAGNOSES NODULAR LEPROSY.

CASE 2.

Case Book No. 168/23—Date of admission, 1/12/23.—still in hospital.

Age 40 years Tribe Bakweri Occupation Farmer.

Patient has been under treatment more or less continuously since April. In this period he has had some twenty-five intravenous injections of Moogrol. Improvement has been steady but slow from the first and the patient has already acknowledged the worth of the drug.

Latterly, the dosage (contrary to the typed instruction sent with the drug) has been steadily increased with marked beneficial results.

His last dose was of 4.c.c. measure.

Instead of being the slightest disturbed by this increased dosage he is on the contrary, much disappointed if the date of his injection is for any reason delayed.

Though the photograph still shows him to be bossed about the face and arms he has completely lost the repulsive leonine countenance which was an exceptionally well-marked feature in his case.

COLONIAL HOSPITAL, LAGOS.

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Large fibromyomata of uterus.

BY DR. W. R. PARKINSON.

The size of this tumour, its difficulty in diagnosis and the complications met with in operation are sufficient to justify recording it.

The patient, a Yoruba woman named Olorun Laja, aged about 30 years was sent to me at the Colonial Hospital, Lagos, by Dr. Stephens of Ilorin on August 13th, 1924.

She had a miscarriage when three months pregnant, eight years before admission; she had no pregnancy before or since that mishap, but she had menstruated regularly for 5 days every month since that time. She dates the beginning of her tumour from the miscarriage but it was not very noticeable until four or five years ago when there was some vaginal obstruction. This was treated by a Native medicine man who introduced so strong an irritant into the vagina that it was almost occluded—a probe passing with difficulty.

During the last four years growth has been regular and rapid until the present condition shown in the accompanying photograph was attained.

The mass was freely movable above, and attached below, dull and rather soft and boggy to feel and without fluctuation.

No vaginal examination could be made.

I considered it was a large ovarian dermoid with semi solid contents. On August 19th, she was given chloroform and with the assistance of Dr. Clive Sharpe and Dr. K. Faderin I removed a mass weighing 33 lbs.

To deliver this mass from the abdomen, which it appeared to fill completely, an incision was made from an inch below the costal margin to the pubes just to the left of the middle line.

It was difficult to determine exactly what relations the tumour had even when the abdomen was open. It appeared to arise in the right blood ligament.

Having drawn it forward it was found to have raised the peritoneum off the posterior wall of the abdomen and the appendix and caecum were stretched out on its surface.

In separating these there was considerable haemorrhage and the right ureter, also stretched over the tumour, was caught in artery forceps and half divided before it was recognised.

The artery forceps was retained until the ureter had been sutured.

Upon completing the removal of the tumour it was found that the uterus remained almost intact the tumour having been attached to its right side and having pushed it into the pelvis.

The tumour was a large fibromyoma but much softer than usual and almost semi fluid. There was no infection or necrobiotic change.

A drain through a stab wound in the flank was left in down to the ureter; this was removed in 48 hours and both wounds healed well. Stitches were out on the 8th day and two photographs after operation were taken on September 8th three weeks after operation.

TETANUS.

War experience of tetanus besides showing the very great value of prophylactic treatment encouraged the giving of very large doses of tetanus antitoxin but even then the mortality was high and there has been some doubt how much value is to be attached to the treatment with either large or small doses.

There is also some question whether tetanus occurs in definitely mild forms.

There have been 148 cases of tetanus in this hospital between April, 1914 and December 31st, 1924. Of these seventy died, sixteen of them on the day of admission and if those sixteen are excluded, they were moribund and beyond treatment on admission, there were fifty-four deaths in 132 cases, a death rate of 40.9% which compares very favourably with the average death rate in tetanus. I therefore think it may be valuable to give an account of the methods of treatment and some opinions I have formed during this period.

The history of these cases in 90% is not associated with any definite wound but probably due to infection through small ulcers of the feet, chiggers are the origin of these ulcers in most cases and the infection is easily explained by the habit of the native walking about bare footed with his chigger ulcers constantly exposed to the possibility of infection.

The length of incubation is therefore quite unknown; chigger ulcers are constant among a large number of natives and definite well marked tetanus is the next stage.

In those cases when tetanus has occurred in a traumatic wound the results have been invariably fatal so that there is little doubt that the organism is as virulent here as elsewhere. Prophylactic doses of 1,500 units U.S.A. antitetanic serum in accident cases have prevented tetanus. I have not met a single case of tetanus in patients who have had this treatment within twenty-four hours of their wound.

I am decidedly of the opinion that the infections through chigger ulcers are milder than the traumatic variety of tetanus and I suggest that these patients become to some extent immune by getting very small doses of tetanus bacilli and that it is only when they have the misfortune to get a heavy infection or are debilitated that they develop tetanus.

In treatment I use 1,500 units of antitetanus serum daily given intramuscularly. This is a very small dose compared with 16,000 units intrathecally and 8,000 units intramuscularly which was the first day dose recommended by the British War Office Tetanus Committee at the end of the War. It is the strongest evidence I have associated with the comparatively low death rate, for suggesting that the disease is comparatively mild here. I consider other treatment of very great importance. A darkened room, no noise, two hourly feeds, increasing as quickly as possible in quantity, and the greatest care over regularity of the bowels are of great importance. An enema is very frequently necessary. A special nurse day and night is necessary.

The usual drug treatment is Pot. Bromide gr. XXV

Sod. Bromide gr. XXV

Chloral Hydrat gr. XX four hourly

but I have also used Chlortetone one drachm in oz. IV olive oil rectally morning and evening and find it extremely satisfactory. I have tried Carbohc Ac. subcutaneously but am not satisfied it is of any value.

I however very strongly advocate Magnesium Sulphate in 20% solution 5 c.c. to be given intramuscularly daily or twice daily according to the frequency of the spasms. I am quite certain that it is of enormous value and I have delayed giving it many times to the effect more definitely shown by the contrast of the patients comfort before and after the injections have begun.

It will be noticed that intrathecal treatment either with antitetanus serum or magnesium Sulphate is not recommended; the chloroform necessary and the consequent shock is so serious that it is unwise in these comparatively mild cases; it was used a good deal at first but there was not a single recovery in any case when intrathecal treatment was tried. There is no doubt this fallacy, that it was used in the more violent cases only; but there was not any encouragement to go on as in no case was there any success.



